Pit and Quarry

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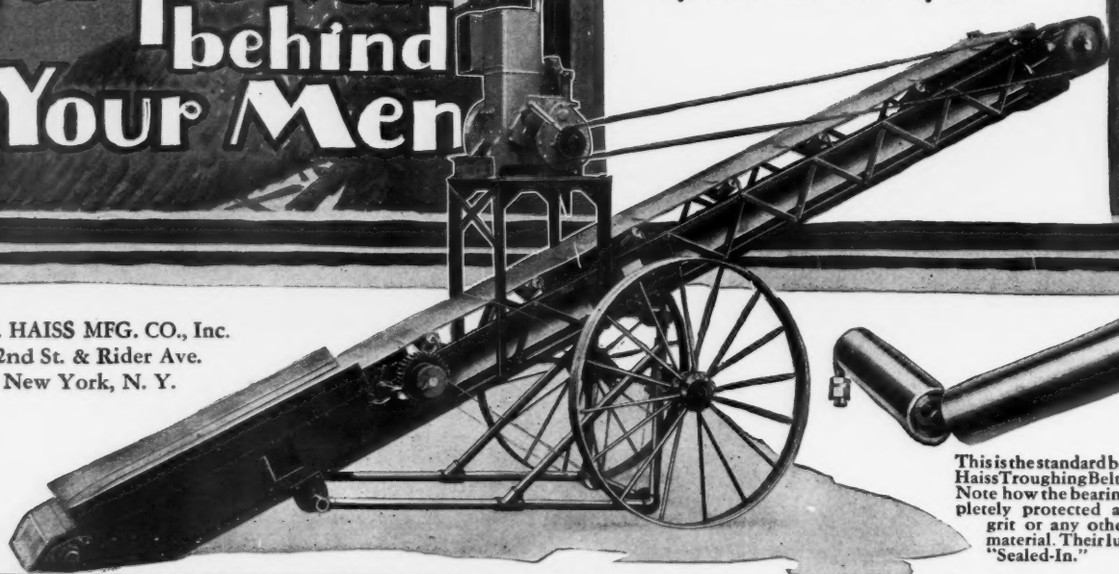

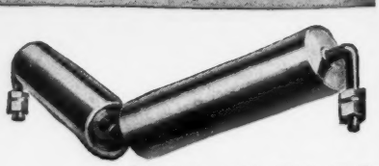

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PORTABLE HAISS BELT CONVEYORS

Pit and Quarry

Vol. XVIII CHICAGO, ILL., MAY 8, 1929 No. 3

MEN OF THE INDUSTRY

The portrait printed on this page in each number of PIT AND QUARRY is taken from our files and its selection is without significance as to current events or as to the position of the individual in the industry.

Blaine S. Smith

Mr. Smith is Vice-president and General Manager of the Universal Portland Cement Company, Chicago, Illinois

Eight Lime Plants in Shelby County, Alabama Distribute Product Over the Entire South

Territory of Less Than Fifty Square Miles Produced Over 200,000 Tons of Lime in 1928

THE lime district of Shelby county, Alabama, has long been famous for the high grade of white lime produced therein. Eight plants now operating in that district produced last year over 200,000 tons of lime, much more than the total output of the remainder of the state. This district starts at Pelham, about twenty miles south of Birmingham, and extends south to Calera, a distance of about fifteen miles. Most of the operations are in an almost straight line between Birmingham and Calera and are visible from the Birmingham-Montgomery highway. Outside of Shelby county only three lime plants, with comparatively small outputs, are in operation in the state of Alabama.

The deposit is almost inexhaustible, as the entire territory of over fifty square miles is underlain with the stone. This deposit is said by geologists to be 1,800 feet in thickness and test drilling to a depth of 1,100 feet has failed to reach its base. The stone is very massive, for the most part, with a few cracks or seams, and has a slope to the east which, in different parts of the district, varies from 20 degrees to 55 degrees. When quarried, the stone breaks into large, irregular pieces which are broken up by mud-capping.

The limestone has a calcium content of over 99 per cent and it makes a very white lime with a high putty yield. It is dark gray in color, very hard and dense, and extremely difficult to burn.

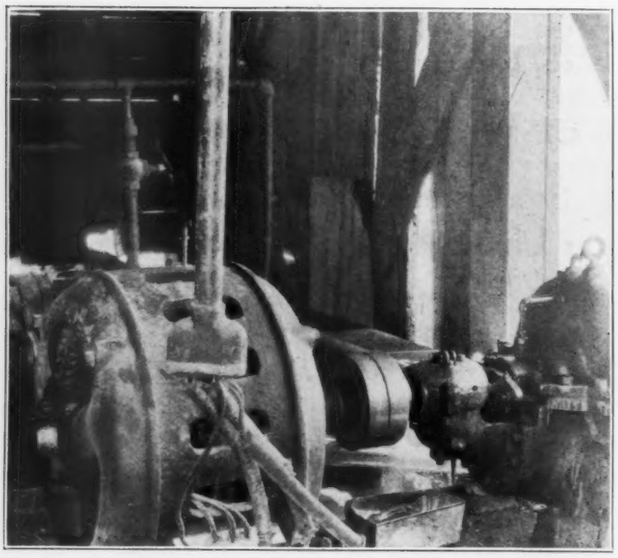
Shipments are made from this district to practically the entire South, supplying a territory bounded by the Atlantic ocean on the east, the Gulf of Mexico on the south, Louisiana to the west, and Tennessee to the north.

The housing and labor problem is solved in a simple manner. The various companies build homes for their employes and families, forming small villages around each plant. Well equipped commissaries maintained by the companies furnish the employes with all of the necessities and many of the luxuries of life, at an extremely low cost, as they are not operated for profit.

Superior Lime and Hydrate Company

THE plant of the Superior Lime and Hydrate Company, at Pelham, is located at the northern extremity of the Shelby county lime district, being about twenty miles south of Birmingham, on the main line of the Louisville and Nashville railroad and near the highway between Birmingham and Montgomery.

Superior Lime and Hydrate Kilns (left) and Hydrator (right)



Dayton-Dowd Pumps at Superior Lime and Hydrate Plant

Quarrying methods are similar to those in other plants in the vicinity, the overburden being removed by hand and with scrapers. Drilling is done with Ingersoll-Rand jackhamers, using drills up to 18 feet in length. Hercules dynamite is used for blasting.

Stone is loaded by hand into 2½-cubic yard wooden cars which are hauled 200 feet to the top of the kilns by an electrically-driven hoist. A small turn-table at the foot of the incline from the quarry facilitates the handling of cars from all parts of the quarry. The quarry at present has a 30-foot face.

Water is pumped from a large sump in the quarry by a battery of four Dayton-Dowd centrifugal pumps, varying in size from 4 inches to 1½ inches, into a large elevated steel water tank. This has a sufficient capacity to allow operations to be carried on even in the driest seasons. These pumps, in the order of their sizes, are driven by Allis-Chalmers 40-h.p., Lincoln 20-h.p., and Westinghouse 10-h.p. and 5-h.p. electric motors. An Ingersoll-Rand 7-in. by 6-in. air compressor, which furnishes air to the jackhamers, is driven by a 50-h.p. Allis-Chalmers motor, which also drives the hoist.

Four of the six kilns at the plant were built six years ago and the other two a year later. All of them are of steel, 30 feet in height and with an interior diameter of 8 feet. They are hand-fired with mixed fuel and hand-drawn into wheelbarrows. The bulk lime is loaded into barrels and bags for shipment, while the lime to be hydrated is dumped into a small jaw crusher. This discharges into a Link-Belt bucket elevator which dumps the lime into a steel hydrator bin of 100-barrel capacity.

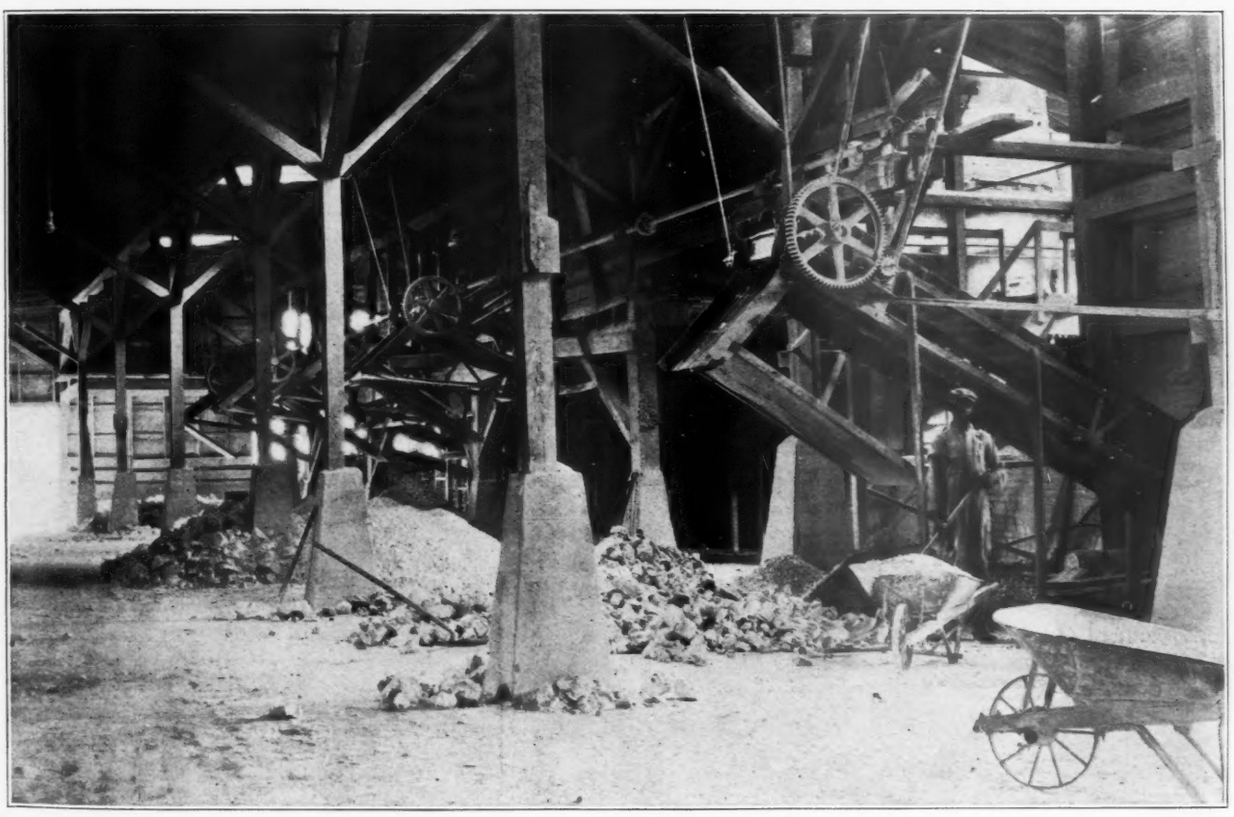
The bin feeds a Clyde hydrator which discharges through a screw conveyor into an air separator. This discharges into a storage bin over a two-tub Bates bagger. All of this equipment except the bagger is driven from an Allis-Chalmers 75-h.p. electric motor. The kilns have a capacity of 500 barrels per day and the hydrator of 1,000 bags in 8 hours. H. G. Bridgewater is proprietor and general manager.

The Keystone Lime Works, Inc

THE operation of the Keystone Lime Works, Inc., at Keystone is one of the three largest in the state of Alabama, with 8 kilns, all of which can be operated. The plant is located about twenty-two miles south of Birmingham, between Pelham and Saginaw. The first kiln here was built in 1890, although the plant first came into the hands of its present owners in 1922. Thirty days after the change in ownership the entire plant, with the

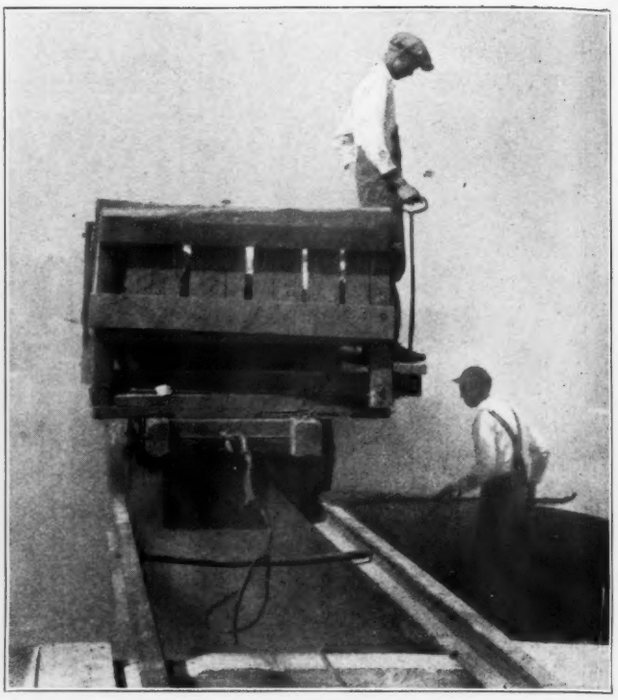
Keystone Lime Works, from Southeast. Incline at left Used Only In Emergency

Looking into Keystone Lime Quarry from North. Sump in Foreground. Note Dip of Strata.



Jeffrey Unloaders on Discharge Floor, Keystone Lime Works

Firing a Kiln Oven at Keystone Lime Works, Inc.



Dumping Car of Stone into Kiln at Calera Lime Works

new plant was immediately erected with concrete foundations and pits, wood framework and corrugated metal siding, and a hydrator installed.

The overburden at the quarry is removed by hand and carted away. Drilling is done with Ingersoll-Rand jackhamers and blasting with Hercules 40-per cent dynamite. The face being worked varies from 25 to 40 feet in height. Stone is loaded by hand into wooden cars which are hauled 500 feet to the top of the kilns by a Lidgerwood 35-h.p. electric hoist. A Gardner 8-in. by 9-in. compressor furnishes air for the drills.

The four oldest kilns were built at different times between 1890 and 1895 and were all the old style rock-and-brick type with wooden cribbing at the top. Since that time, however, the tops have been steel jacketed. The four newer kilns are of the steel-jacketed Keystone type and were built in 1904. Each is 12 ft. in diameter and 49 ft. high. All of the kilns are hand fired but, with the exception of two of the older ones, they are drawn by Jeffrey pan conveyors. A grizzly screw on each conveyor removes all fines and dust.

Interior, Keystone Lime Works, Hydrating Equipment (center), Bates Packer (left)

Kiln-run lime is shipped in bulk and in barrels. Lime for hydration is carried by wheelbarrow to a Sturtevant No. 1½ gyratory crusher. This discharges into a Jeffrey bucket elevator which discharges into a steel bin over the Clyde No. 2 hydrator. The hydrator discharges into a concrete bin from which a Jeffrey screw conveyor carries the lime to the Raymond Type O air separator. A Raymond No. 12 fan carries the finished hydrate to a steel bin of 1,200-barrel capacity over the Bates four-tube bagger. The kiln capacity of this plant is about 1,000 barrels per day and of the hydrator about 50 tons in 9 hours. Harbison-Walker silica fine brick is used in the heat zones of all the kilns.

Water for hydration and drinking purposes is pumped from a well, bored 160 feet deep into solid limestone, to an 18,000-gallon capacity steel water tank. A complete blacksmith and machine shop is maintained in which most of the repair work is done. A well-stocked commissary is maintained in the same building that houses the commissary. W. A. Hammond is president of the company and his sons, M. W. Hammond and W. V. Hammond, are, respectively, secretary and treasurer, and plant superintendent.

R. E. Bowden, Sr. (left), R. E. Bowden, Jr., of Calera Lime Works, Inc.

The Calera Lime Works, Inc.

THE plant of the Calera Lime Works is located on the Southern railroad at Roberta, about 3 miles west of Calera. The property totals 615 acres, of which 190 acres is limestone. The plant has been operated by this company for about ten

Schulthess Hydrator in Calera Lime Works

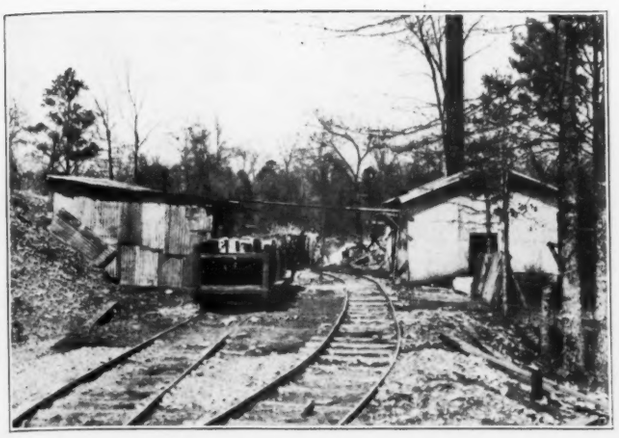
Calera Lime Works from South

years, only one kiln being installed at the time the plant was acquired. Another kiln was built in 1922 and the third in 1925. The hydrating plant was installed late in 1927.

The quarry is about one-half mile north of the plant. A 60-foot face is worked at present, but another level of 30 feet will be started in the near future. Sullivan and Ingersoll-Rand jackhammers are used for drilling and DuPont 40- and 60-per cent dynamite for blasting. Stone is loaded by hand into 2½-ton wooden cars and hauled to the top of the incline from the quarry by a small steam hoist. Hauling from the quarry to the plant is by mules. A small electric hoist at the plant hauls the cars up an incline to the kilns.

A building housing the boiler and machine shop is maintained at the quarry. In this shop most of the minor repair work is done. This building contains a steam-driven 8-in. by 8-in. Sullivan compressor which furnishes air for drilling, and a Cameron 6-in. steam suction pump which drains the quarry from a sump into a near-by creek. A

View in Quarry of Calera Lime Works, Inc.

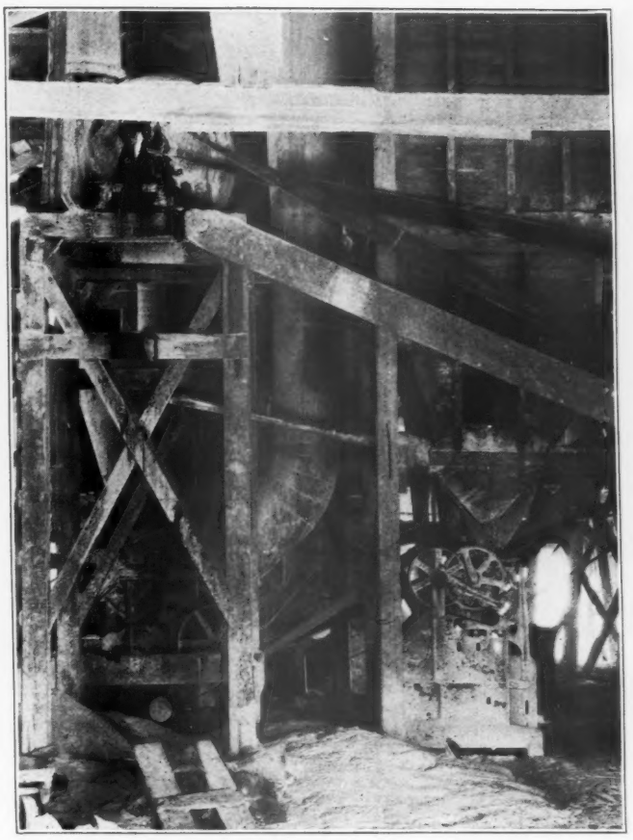


Hoist House (left), Boiler House (right), Cars Waiting to be Hauled to Calera Lime Plant

125-h.p. boiler furnishes steam for these operations. Among other equipment is a Buffalo Forge Company hand drill.

The oldest of the kilns is of brick, while the two newer ones are steel, but all are 35 feet high, with a 9-foot interior diameter. They are hand-fired with mixed fuel and are hand-drawn every 12 hours. Jeffrey pan conveyors are to be installed later. Each kiln has four furnaces and is equipped with Thomas shaker grates. At the top of each kiln, a 50-ton capacity circular steel hopper has been built to insure a constant supply of stone. The kilns have a capacity of 500 barrels per day.

The lump lime is forked into bags and barrels and the fines taken by wheelbarrow to the hydrator, no crushing being necessary. The hydrator is a Schulthess continuous type and has a capacity of 4 tons per hour. It discharges into a McGann bucket elevator which feeds a McGann screw conveyor to the Sturtevant centrifugal air separator. The separated tailings go by screw conveyor and chute back to the hydrator and the finished hydrate into the 35-ton capacity steel bin that feeds the



Interior, Main Building, Raymond Seperator (left), Bates Packer (right), at Newala Lime Works

4-tube Bates bagger. Each of these units is driven by an individual Howell electric motor.

The main plant building has concrete foundations and floor, wooden framework and corrugated metal siding. It has a storage capacity of 20,000 50-pound sacks. All lime is weighed here on a Howe 1,000-pound capacity platform scale. A Sturtevant No. 1 rotary crusher is stored in this building to be used later.

R. E. Bowdon is president and general manager of the company and his son, R. E. Bowdon, Jr., is secretary and treasurer.

View of Newala Lime Works from West

Transport of Stone to Kiln at Newala Lime Works

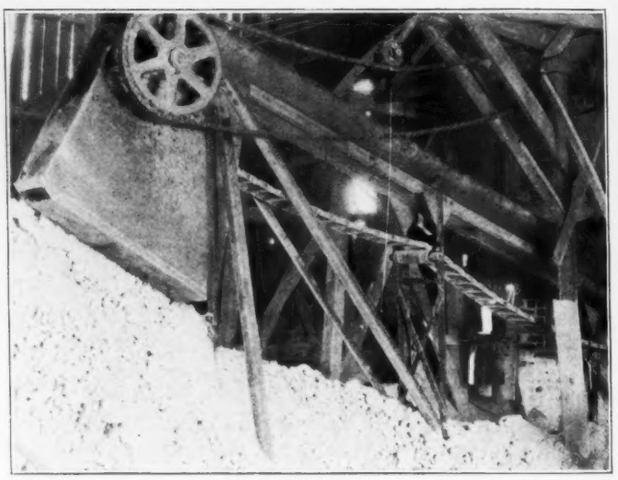
The Newala Lime Works

THE plant of the Newala Lime Works is at Newala, about 3½ miles west of Calera. Operations here are very similar to those commonly employed in this territory. Cleveland air drills using steel up to 12 feet in length and Hercules and Du-Pont 40-per cent dynamite are used. Ensign-Bickford safety fuse is used to set off the shots. Quarry cars are loaded by hand and hauled from the quarry by a Flory two-drum steam hoist, the second drum being used to haul cars of waste stone up another incline to a dump. Mules haul the cars to the plant, which is one-third mile distant.

Sacking Hydrated Lime at the Newala Lime Works

The compressor house at the quarry contains an Ingersoll-Rand 7-in. by 9-in. air compressor which furnishes air for the drills and for a Worthington steam pump in the quarry. At the time of visit this pump was operated on air because it was under water due to recent heavy rains. A 40-h.p. boiler furnishes steam for the hoist and for the pump under normal conditions.

The kiln now being used at the plant was erected two years ago, although another brick kiln which is about twenty years old can be used in an emergency. The capacity of the newer kiln is about 150 barrels per day and an additional 100 barrels can be attained by using the old kiln. A Lidgerwood hoist driven by a Fairbanks-Morse 10-h.p. electric motor hauls the cars to the top of the kiln. The kiln is fired with mixed fuel and is drawn by a Montgomery chain conveyor driven by a 15-h.p. Fairbanks-Morse motor.



Montgomery Chain Conveyor for Drawing Kiln at Newala Lime Works

The hydrator is of the Schulthess type and discharges into a Raymond air separator. This feeds into the bagger bin which feeds the Bates two-valve bagger. Montgomery bucket elevators and screw conveyors carry the lime through the various operations. All of the machinery except the bagger is driven by an R. D. Cole steam engine with a 60-h.p. boiler. Weighing of lime is done on a 600-pound capacity Fairbanks scale. F. H. Hardy owns this plant and operates it with the assistance of his son, John M. Hardy.

The Alabama Lime and Stone Corporation's Operations at Calera

THE operations of the Alabama Lime and Stone Corporation at Calera are among the largest in this district and the new lime plant, when it is completed about July 1, will be as modern an

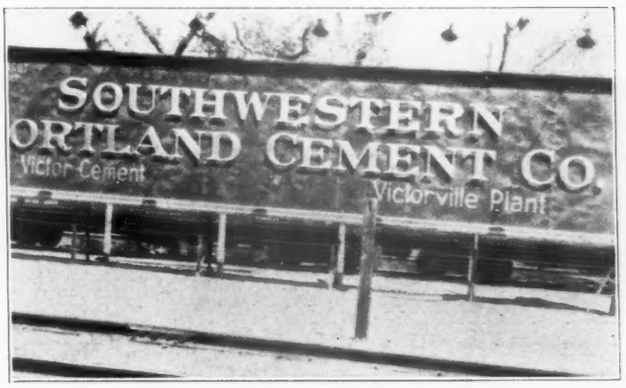
(*Continued on page* 63)

Successful Operation of a Cement Plant on the Edge of the Mojave Desert in California

By GORDON F. SONDRAKER

THE Mojave desert, whose arid wastes stretch mile after mile, is a veritable treasure house of non-metallic minerals. The great county of San Bernardino in California, comprising an area greater than the state of Rhode Island, is made up largely of desert wastes. It has been credited with being the richest area of non-metallic minerals in the world. Here one may find practically every known non-metallic. Among the greatest of these, as far as revenue is concerned, are the raw materials, limestone and clay or shale, for the manufacture of cement.

On the edge of this desert near the little town of Victorville, is the modern cement plant of the Southwestern Portland Cement Company. Situated on the banks of the Mojave river, which furnishes the sole relief from the barren wastes and, from the practical side, a steady source of water for operations, and adjacent to the tracks of two transcontinental railroads as well as a transcontinental highway, the company has all the facilities for economical cement manufacture.

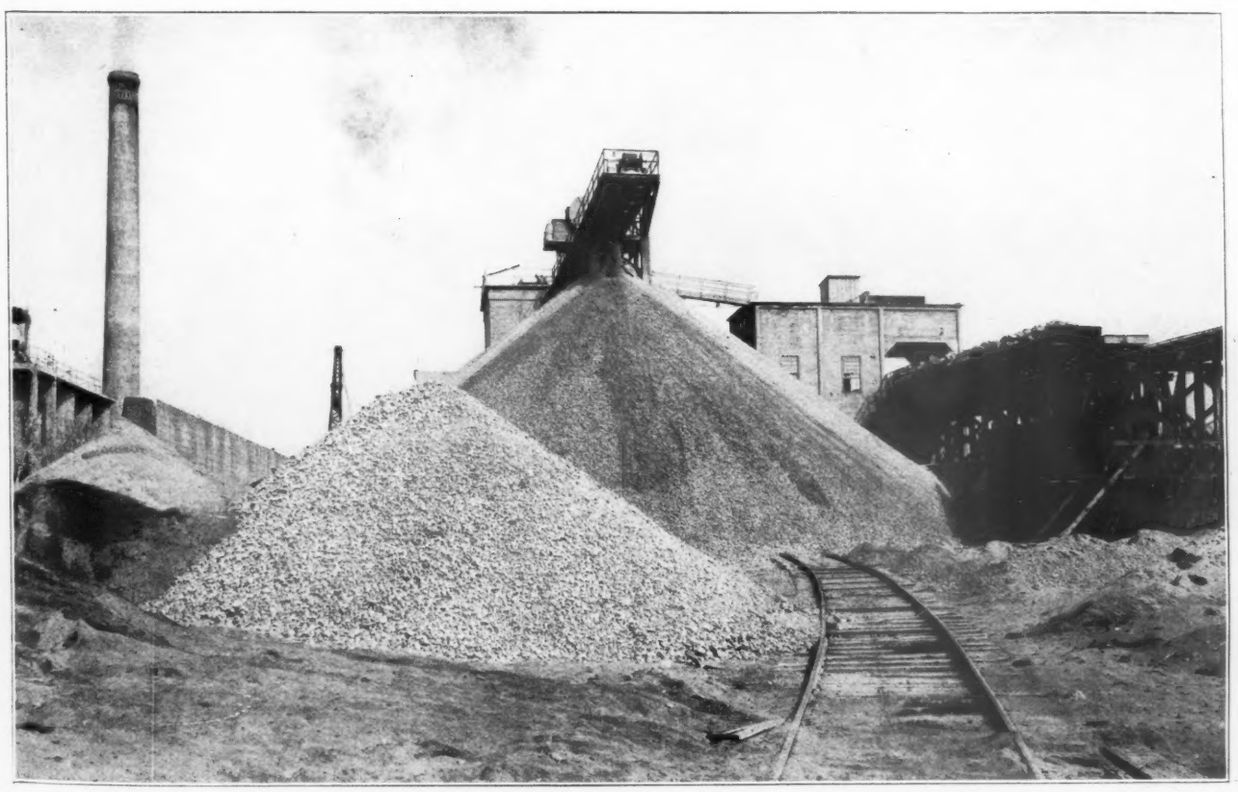


Sign Beside Highway

The Quarries

There are five of them either being developed or in operation—comprise an immense tonnage of lime rock and shale or clay so intermixed that both materials are handled at the same time. No endeavor has been made to separate the materials because, in their present form and under the very able supervision of R. M. Wilson, chief chemist, they form an almost ideal cement raw mix.

A constant development program is pursued at the quarries and for this purpose two Armstrong electrically driven blasthole drills are in operation. These drills are constructed with steel frames to insure minimum wear and tear. They drill a five-



Rock and Shale Storage for Jaw Crusher. Williams Mill Product

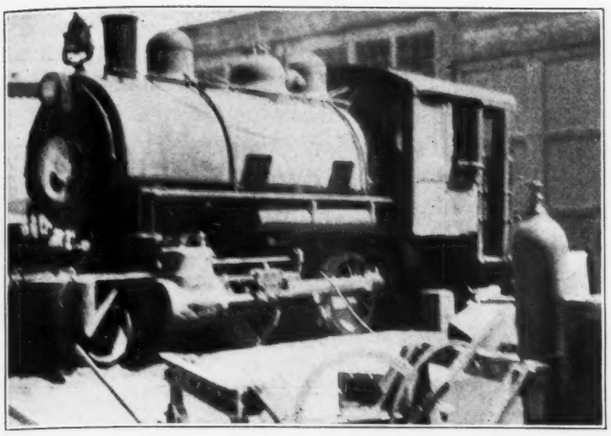
View in Quarry After a Blast

Cement Storage Silos

inch hole which, when loaded properly with powder, insures a large tonnage of rock to each major blast. An Ingersoll-Rand 12-inch by 10-inch air compressor furnishes air for the latest type Ingersoll-Rand jack-hamers. These machines do the drilling for minor blasting and tunnel driving.

Four of the five quarries are in operation, the fifth quarry being developed for future use. Quarry operation has proved economical by the use of a Bucyrus type 80-B electrically driven shovel, equipped with a 2¼-yard dipper, and a Marion type 125 electrically driven shovel equipped with a 2½-yard dipper. These shovels have direct-current motors operated through a Ward-Leonard control. Both shovels are equipped with caterpillar tracks to furnish the maximum mobility. The shovels load directly into standard-gauge cars equipped with three side-dump skips, each car having a total capacity of thirty tons. These cars were designed by the engineering department of the Southwestern Portland Cement Company and lots of the thirty-seven cars in service were constructed by the Pacific Car and Foundry Company of Seattle, Washington, the Lacy Manufacturing Company of

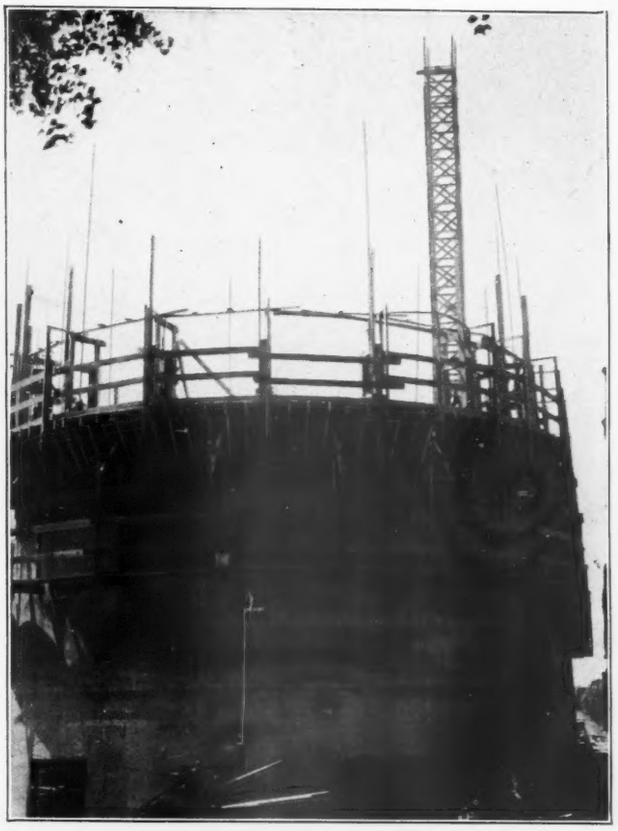
Dump Cars Ready to Unload Rock Into Gates Jaw Crusher in Victorville Plant



Davenport Locomotive

Los Angeles, and the Llewellyn Iron Works, more correctly known at this time as the Consolidated Steel Corporation of Los Angeles. The cars are hauled six miles from the quarry to the plant by three 60-ton Davenport locomotives, which are in continued service, and one 40-ton H. K. Porter locomotive.

At the plant the loaded cars are pushed up an incline track over the crusher, at which point they are attached to a cable car which is, in turn, attached to a steel cable running to a hoist operated



Huge Cement Silo Under Construction

Motor Room for Raw and Finishing Mills, Southwestern Portland Cement Company, Victorville

Safety Board, Showing Accident Records for 1927 and 1928

Sewing Room in Sack Repair House

by a 30-horsepower Westinghouse electric motor. The hoist is equipped with a Westinghouse magnetic brake. The hoist, through the cable car, spots the loaded cars over a 48-inch by 60-inch Allis-Chalmers Blake-type jaw crusher. These cars are dumped by a motor-driven friction hoist. The crusher is powered by a Westinghouse 250-hp. motor, which transmits power to the crusher through a three-ply 18-inch by 20-foot leather belt. The rock sometimes jams in the crusher hopper and will not feed properly. To overcome this difficulty a compressed-air hoist has been installed to turn the rock over in the crusher. A steel hook is connected to the hoist and this unfailingly breaks up any jam in the hopper.

Plant Superintendents, Southwestern Portland Cement Company. Left to Right: H. E. Nichols, El Paso Plant; L. V. Robinson, Victorville Plant; W. T. Gronar, Osborn Plant

The jaw crusher reduces the material to 12-inch and finer. It then falls into a Stephens-Adamson jumbo bucket elevator driven by a 30-hp. Westinghouse motor through a Foote Bros. speed reducer. This elevator dumps the material onto a Robbins five-roll grizzly, which allows the fines or the material ¾-inch and under in size to fall to a belt

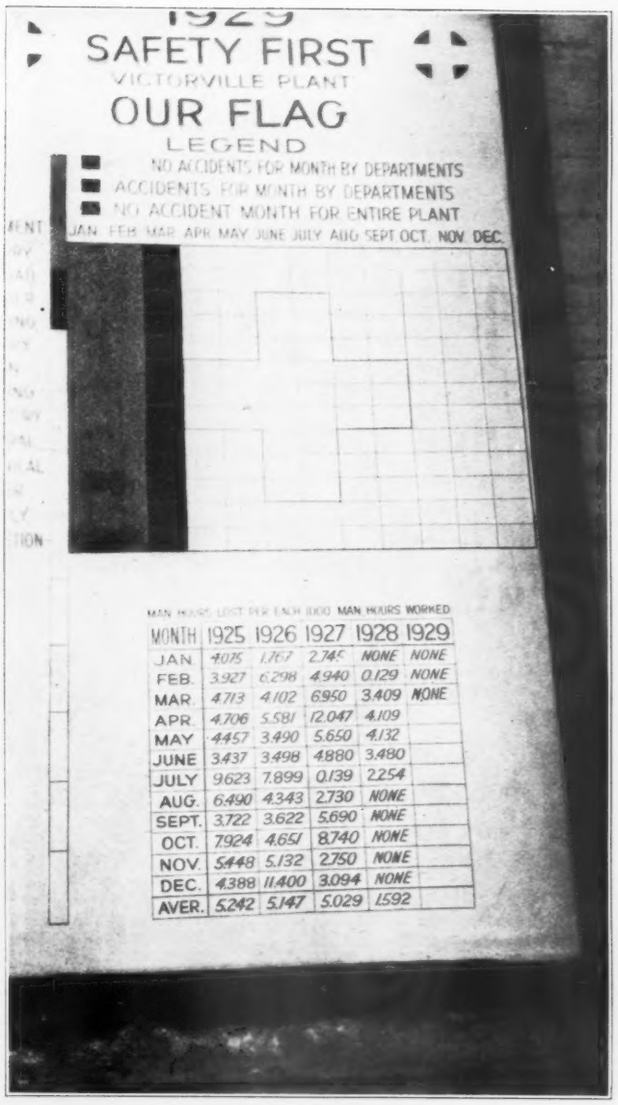
conveyor leading to the rock storage, and the material over ¾-inch is chuted to a number 9 Williams hammer mill, which reduces the oversized material to 2-inch and under. The Williams hammer mill is driven by a Westinghouse 450-hp. motor, direct-connected through a flexible coupling. An air dust collector is used to remove any dust caused by the Williams mill during grinding. As the crushed material leaves the Williams mill, it falls into the jumbo elevator which elevates it and dumps it on a 30-inch by 240-foot belt conveyor

Conveyor from Crushed Rock Storage to Mill Feed Bins

using Goodyear belting. The crushed product is thus conveyed out over the rock storage. A friction drive Stephens-Adamson belt tripper is used in connection with the conveyor to dump the material where desired.

Rock Drawn from Storage by Belt Conveyor

As the raw material is needed, it is drawn from the stock piles onto a 24-inch belt conveyor. There are two of these belt conveyors, each operating in a


1929
SAFETY FIRST
VICTORVILLE PLANT
OUR FLAG
LEGEND
NO ACCIDENTS FOR MONTH BY DEPARTMENTS
ACCIDENTS FOR MONTH BY DEPARTMENTS
NO ACCIDENT MONTH FOR ENTIRE PLANT
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
MAN HOURS LOST PER EACH 1000 MAN HOURS WORKED

MONTH	1925	1926	1927	1928	1929
JAN.	4.075	1.767	2.745	NONE	NONE
FEB.	3.927	6.298	4.940	0.129	NONE
MAR.	4.713	4.102	6.950	3.409	NONE
APR.	4.706	5.581	12.047	4.109	
MAY	4.457	3.490	5.650	4.132	
JUNE	3.437	3.498	4.880	3.480	
JULY	9.623	7.899	0.139	2.254	
AUG.	6.490	4.343	2.730	NONE	
SEPT.	3.722	3.622	5.690	NONE	
OCT.	7.924	4.651	8.740	NONE	
NOV.	5.448	5.132	2.750	NONE	
DEC.	4.388	11.400	3.094	NONE	
AVER.	5.242	5.147	5.029	1.592	

Victorville Plant's Safety Record for 1929

separate tunnel under the rock storage. These belt conveyors convey the material to a Stephens-

Fuel Oil Storage Tanks at Victorville Plant

Company's Club House for Employees

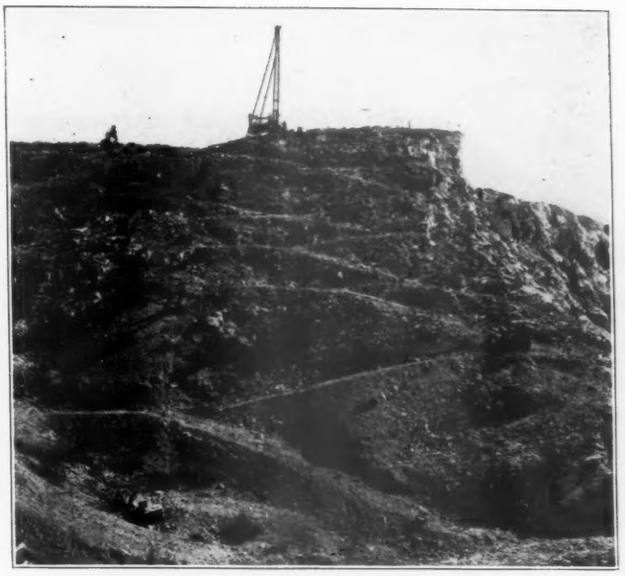
Adamson elevator, which elevates it to a Robbins five-roll grizzly. The grizzly removes any material over ¾-inch in size and chutes it to a number 3 Kennedy-Van Saun gearless gyratory crusher. This crusher reduces the material to the required size and drops it to the original elevator, which returns the material to the grizzly and thence to the belt conveyor which has removed the original fines from the grizzly. This belt conveyor carries the material over the mill feed bins. A Stephens-Adamson friction-drive tripper is used to trip the material from the conveyor into the five raw mill-feed bins.

One Traylor 7-foot by 40-foot, three-compartment mill and four Allis-Chalmers two-compart-

Clinker Storage. P. & H. Traveling Crane with Blaw-Knox Speed Bucket Handling Clinker and Gypsum

ment 7-foot by 26-foot compeb mills are used for raw grinding. The Traylor mill is equipped with a table feeder driven by two 2-hp. Westinghouse motors operating through two Foote Bros. speed reducers. Water for wet grinding is added at this point. The mill itself is driven by a 900-hp. Allis-Chalmers Hy-torque synchronous motor direct-connected to the mill. The Allis-Chalmers compeb mills are equipped with rocker feeds and the water is introduced into the mill through the screw conveyor on the feeder. The four Allis-Chalmers compeb mills are each powered by a 500-hp. Allis-Chalmers synchronous motor direct-connected with the mill through an Allis-Chalmers magnetic clutch.

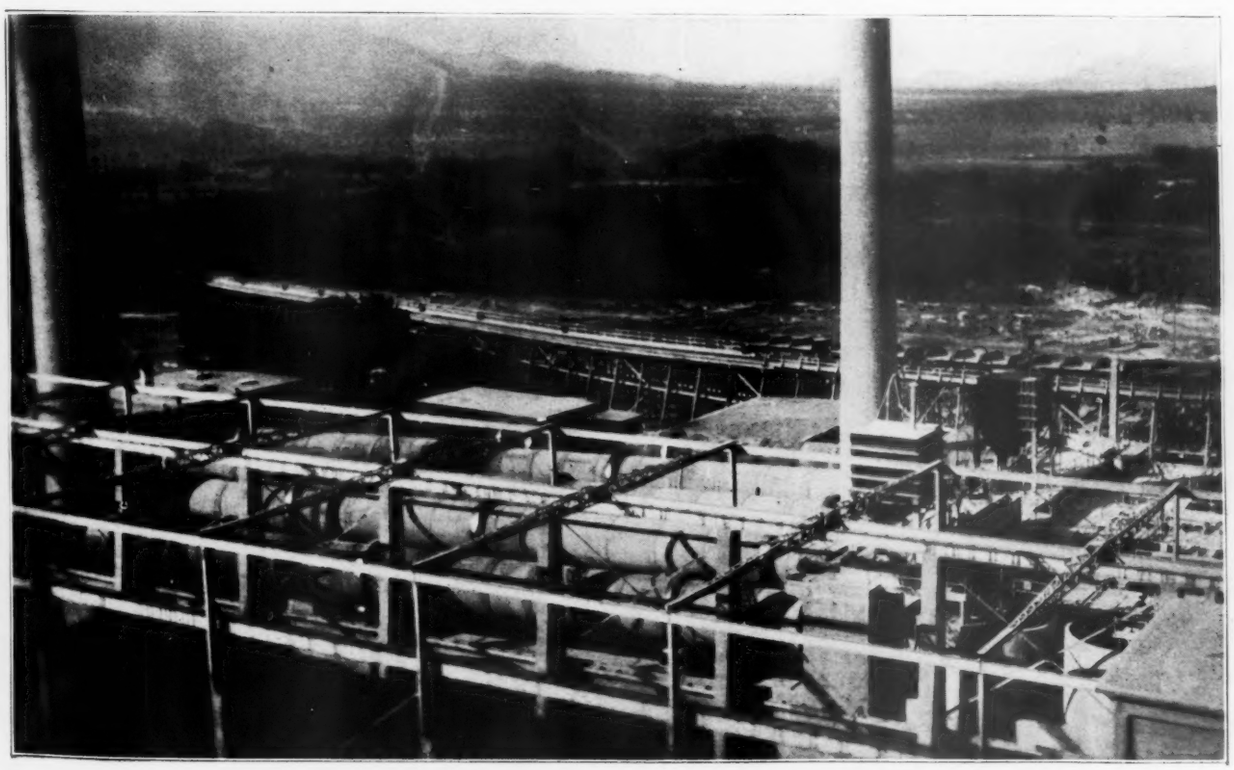
As the ground raw material or slurry leaves the mill it passes over Hum-mer screens, which remove any foreign substance, and is then taken by 4-inch Wilfley pumps and delivered to the slurry tanks. There are sixteen reinforced concrete slurry tanks, each measuring 36 feet by 16 feet. All the tanks have cone bottoms and the slurry is kept agitated by air. Eight of these slurry tanks are used as mill tanks—that is, to receive the slurry from the mill. At this point, samples of the slurry are taken by the chemist for analysis. Four of the sixteen tanks are used as mixing tanks to receive the slurry from the desired mill tanks and mixed to the correct chemical constituency. After the slurry is mixed correctly, it is pumped by 3-inch Wilfley pumps to the remaining four tanks, which hold it as kiln feed. One Ingersoll-Rand Imperial compound type 10 duplex air compressor



Armstrong Drill Rig Above One of the Quarries

furnishes the air for slurry agitation while in the various slurry tanks. Wilfley 3-inch pumps handle the slurry from the kiln feed tanks to a concrete trough behind and above the kilns. From this trough a ferris-wheel type feeder feeds it into the kilns.

There are five rotary kilns in operation. Two of them are 9 ft. in diameter and 200 ft. long, two are 10 ft., 6 in. in diameter and 200 ft. long, and the remaining one is 10 ft. by 13 ft. by 200 ft. Four of the kilns ride on four sets of cradle trunnions. The fifth or largest kiln rides on two roll trunnions and is further equipped with slip tires.



Elevated Track to Crusher and Kilns

Close-Up of Bucyrus Shovel

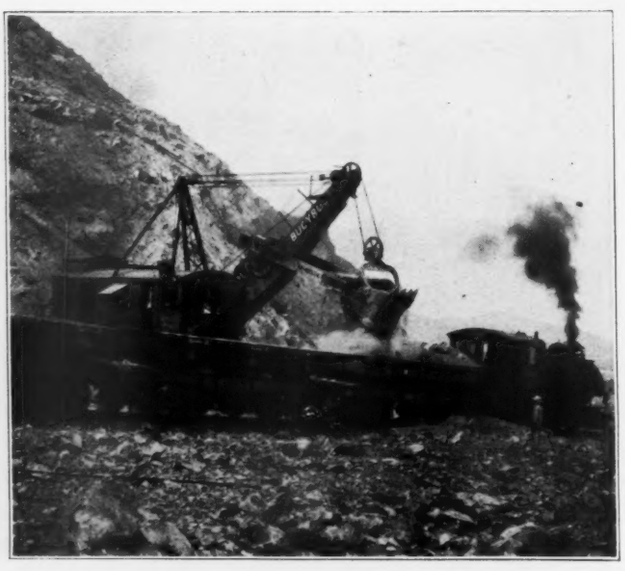
This latter kiln is of Traylor manufacture, while one of the other four is by Allis-Chalmers and the remaining three by Vulcan Iron Works. Each of the kilns is driven by a 50-hp. Westinghouse motor through Foote Bros. speed reducers.

The kilns are fired with fuel under pressure furnished by Kinney oil pumps, the additional air blast being furnished by General Electric centrifugal compressors. Storage capacity is furnished for 2,000,000 gallons of fuel oil, thus obviating any possible unforeseen shortage.

The stack dust (which is encountered in any cement plant, regardless of whether it is a wet or dry process plant) is here collected by a dust collector designed by the engineering department of the company. This collector takes the dust from the kiln stacks and feeds it into the slurry at the point where it enters the kiln.

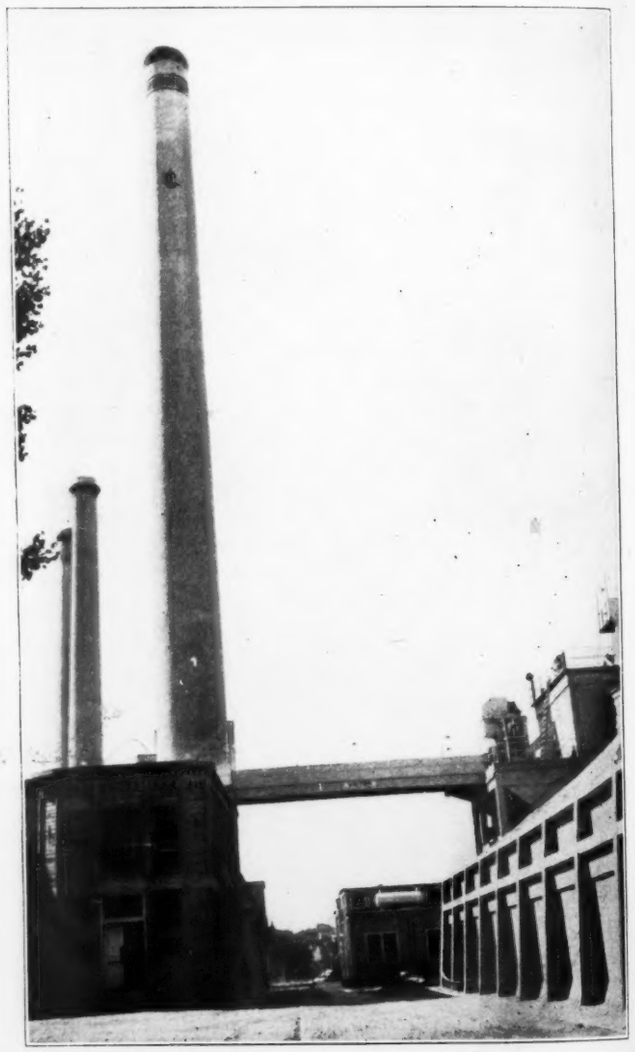
Economical Clinker Handling

The clinker falls from the kilns into five rotary coolers each measuring 7 feet by 90 feet, and, as it leaves the coolers, it falls into a shovel conveyor which conveys it to two Stephens-Adamson bucket elevators. These elevators lift the clinker over the side wall of the clinker storage, as may be seen in one of the illustrations. The coolers chill the clinker so successfully that, although it leaves the kiln at a red heat, when discharged from the coolers it may be held in the hand with no discomfort.



Bucyrus Electric Shovel Loading Train in Quarry

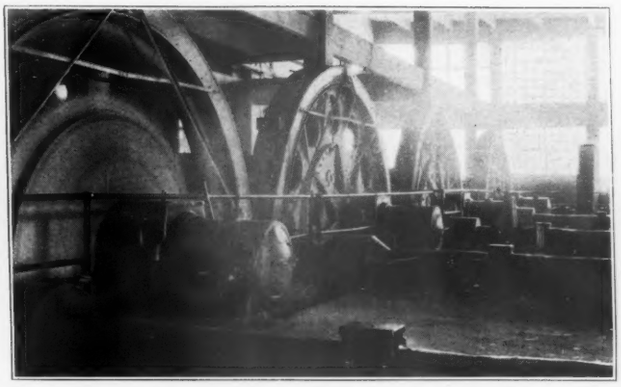
Clinker is taken from the pit, where it has been dumped by the elevators, by a P. & H. 20-ton overhead traveling crane using a Blaw-Knox high-speed 4-yard bucket. This crane distributes the material over the clinker storage as desired. The P. & H. crane is used also to unload the cars of gypsum that are placed on a track under the crane at the end of the clinker storage. This P. & H. equipment has been in service for a comparatively long time and has proved very satisfactory in the economical handling of clinker and gypsum.



Kiln Stacks at Victorville Plant

Clinker is drawn from the clinker storage by a Stephens-Adamson belt conveyor using a 24-inch by 180-foot Goodyear conveyor belt. This belt conveyor runs in a tunnel underneath the clinker storage and is driven by a 30-hp. Westinghouse motor through a Foote Bros. speed reducer. At the dis-

Belt Conveyor Under Sly Sack Cleaner



Drive and Discharge Ends of Four of the Compeb Mills Grinding Raw Material

charge end of the conveyor, the belt passes over a high-duty magnetic pulley manufactured by the Magnetic Manufacturing Company. This pulley removes any tramp iron that may be in the clinker. The clinker falls from the belt conveyor into a Stephens-Adamson bucket elevator, which elevates it into a bin over a set of automatic mixing scales, at which point the gypsum is added.

The mixture of clinker and gypsum falls from the mixing scales into a set of 36-in. by 16-in. type C Buchanan rolls driven by a 40-hp. Westinghouse motor which transmits power to the rolls through a belt drive. These rolls reduce the clinker to ½-inch and finer. The clinker falls into a bucket elevator which elevates it to a chain drag. This chain drag conveys the clinker and gypsum to bins over the finish mills.

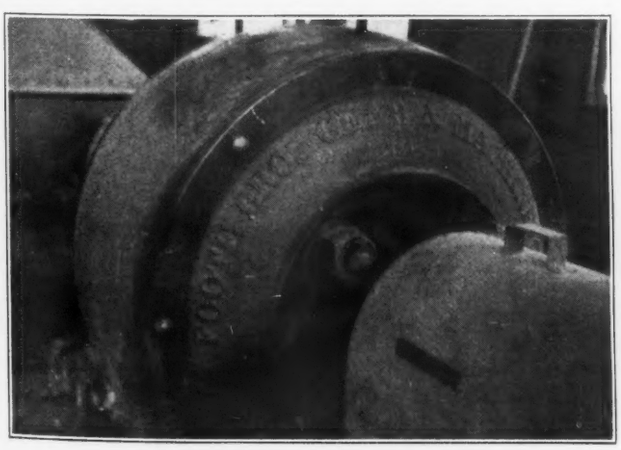
Finish Grinding

Four two-compartment Allis-Chalmers 7-foot by 26-foot compeb mills and one Traylor 7-foot by 40-foot mill are used for finish grinding. The four Allis-Chalmers mills are powered by 350-hp. to 500-hp. Allis-Chalmers synchronous motors, direct-connected through Allis-Chalmers magnetic clutches. The Traylor mill is powered by a 750-hp. Hy-torque motor. An air separator is operated in conjunction with each mill. The properly sized material is taken from the air separators and pumped to cement storage silos by 6-in. by 18-in. Fuller-Kinyon pumps. The over-size material is returned from the air separators to the mills for regrinding. Complete dust-collecting equipment is provided to keep the air in the mill building clear so that working conditions may be ideal.

There are eight reinforced concrete silos to take care of the finished cement. Four of these silos have a capacity of 25,000 barrels of cement each, and four have a capacity of 10,000 barrels of cement each, or a total finished cement storage capacity of 140,000 barrels.

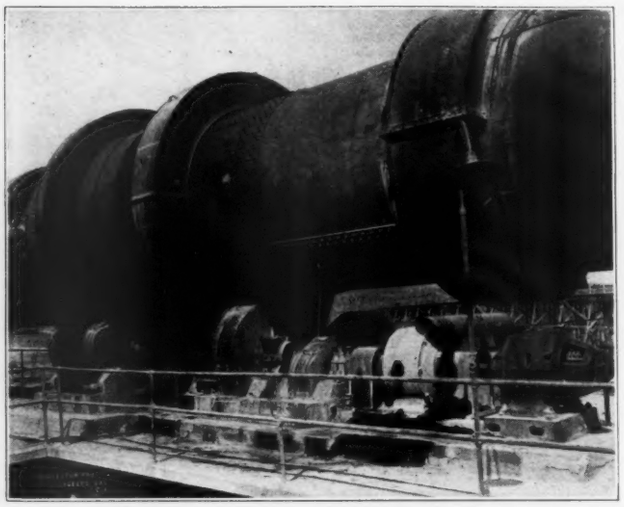
Cement is drawn from these silos into three 18-inch by 200-foot screw conveyors using ribbon flights. Each of these conveyors is split in the middle and each section has a separate drive, thus obviating any unusual torque or strain. The screw conveyors convey the cement to elevators which, in turn, elevate it to bins over four 3-valve Bates packers. One man operates each packer and, as the sack of cement is filled, it is tripped off the machine and falls, or rather slides, to a platform beneath the packing machine.

A chute is provided immediately beneath this platform down which all broken sacks are thrown. The broken sacks fall to the basement and the cement is dumped into the elevator leading to the packer bins. The sacks themselves are either sent to the sack repair house or are discarded, depending upon their condition. The perfect sacks of cement are taken from the platform beneath the packer and placed on a truck and then trucked by



Foote Speed Reducer on Williams Hammer Mill

Office-Laboratory Building



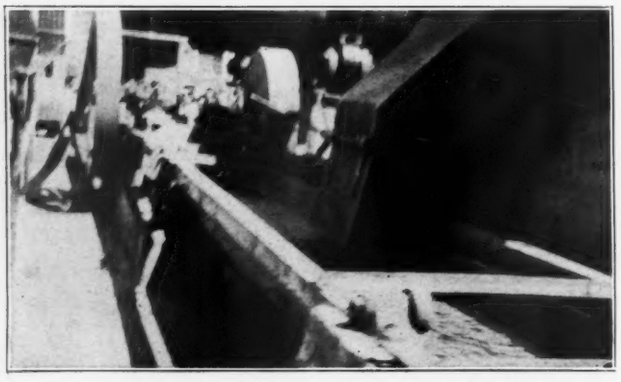
Kiln Drive, Direct-Connected Through Foote Speed Reducer

hand into the cars. Five loading tracks are available with a total capacity of sixty cars.

Modern Sack House

A modern and completely equipped sack-house is maintained. The returned sacks coming by freight cars are removed from the cars to a freight elevator, which elevates them to the fourth floor of the building. The bundles are untied and the sacks are fed into the Bethlehem tumbling mill which removes all the dust from them. This dust is captured by Sly dust collectors and returned to the packing bins. The sacks come out the bottom of the cleaning equipment dustless. They fall onto a 36-inch by 30-foot belt conveyor which runs between four men who sort the sacks into three groups: those needing sewing, those needing small patches, and those that are in condition to be used again.

The sacks in need of repairs are trucked to the sewing room, where they are sewed by Singer industrial sewing machines and then either stacked in storage or sent to the bag tyer. A Bates automatic tying machine, with a capacity of 20,000 sacks per eight-hour day, is used for tying. The tied sacks drop through a chute in the floor to the Bates packers on the floor beneath, where they are packed with cement and shipped.



Cooler Discharge to Shovel Conveyor

Complete Equipment for Handling Miscellaneous Work

A 25-ton Link-Belt railroad-type crane is used in and about the plant for unloading heavy equipment from incoming cars and for general utility work. This crane has proved a great time saver for this type of work.

Due to the distance of the plant from San Bernardino, the nearest city with adequate machine-shop equipment, it has been necessary to install a shop at the plant, completely equipped to handle all classes of work that arise around a plant of this nature. Four lathes are in operation in this shop —an American 12-inch lathe, a Monarch 20-inch lathe, a Le Blond 20-inch lathe, and a Harrington 40-inch lathe equipped with a Gaap bed. The equipment also includes a Fosdick radial drill-press, a Barnes drill-press, a Racine power hack-saw, a Caldwell 300-ton wheel-press and a Landis bolt-threader. To handle the heavier material to be machined, a 5-ton Cyclops hand-operated crane has been installed. This crane may be moved on runners to practically any point in the shop.

Link-Belt Railroad Crane at Victorville Plant

The store-house for replacement parts, bolts, and nails and other minor supplies is a model of perfection. All the smaller parts are kept in bins and properly labeled, so that there is no delay in searching for any desired article. Parts are issued only on requisition, thus obviating any wastage or loss. The store-room is equipped with a 5-ton Cyclops hand-operated crane traveling on overhead steel tracks, so that the heavier equipment may be transferred as desired with a minimum of effort. The store-room and machine shop are located in the central part of the plant to facilitate the obtaining of spare parts and repaired equipment.

A laboratory, modern in every respect and completely equipped for cement analysis, grinding, and experimental burning, is maintained in the office building. A small rotary oil-fired kiln is used for making tests on cement burning. A Riehle com-

pressive strength machine and a Fairbanks-Morse tensile strength machine insure the cement being up to standard before it leaves the plant. A small Symons disc crusher and a small jaw crusher are used for crushing, and a two-jar Abbe mill, power driven, is used for experimental grinding. The laboratory, under the supervision of R. M. Wilson, has maintained the quality of Victor cement at a high standard.

L. V. Robinson, superintendent of the plant, is a strong disciple of the safety movement. A billboard on which all lost-time accidents are recorded is displayed in a conspicuous place in the mill. The interest and cooperation on the part of the employees has been so sincere that they have just completed eight no-accident months. It is the avowed intention to go through 1929 without a lost-time accident. A safety class meets periodically and is instructed in the various methods of accident prevention and first aid. The interest shown in the employees by the company in the safety campaign, the adequate wages, and the excellent working conditions have reduced the labor turnover to a minimum. During 1928 only twelve men left the employ of the company. An example of the treatment of the employees is the fact that all quarry laborers are transported between the plant and the quarry in a standard railroad coach. Surely no company could have a greater interest in the welfare of its employees.

The writer is indebted to L. V. Robinson, superintendent; R. M. Wilson, chief chemist; Bert Haruff, general foreman, and E. H. Williams, chief electrician, for their courtesies and cooperation in furnishing material for this article.

Shelby County Lime Plants

(*Continued from page 52*)

operation as it is possible to find anywhere. The lime plant is operated in connection with a crushed stone plant which is also very new and modern, having been in operation only a year. Construction is of steel throughout and only the very best equipment is used.

The two steel Schaffer shaft kilns are each 90 ft. in height and 17 ft. 4 in. interior diameter. They are automatically drawn at intervals of 20 minutes by hydraulic gates and are fired by automatic stokers of Schaffer design. Crushing of the lime is done by a Jeffrey single-roll crusher. Hydrated lime is made by a Schaffer hydrator equipped with a Raymond vacuum separator. The combined capacity of the two kilns is about 900 barrels per 24 hours. A complete description of the entire operations, including both lime and crushed stone plants will appear in an early issue of PIT AND QUARRY.

Other Operations in Shelby County

The 8-kiln plant of the Saginaw Lime and Stone Company at Saginaw, about 25 miles south of Birmingham, is among the largest in this district. Part of the plant is new, four kilns and two hydrators having recently been put into operation. A complete description of the operations at this plant was published in the April 10 issue of PIT AND QUARRY.

In addition to the plants described above there are three others operating in this district. The Alabama Lime and Stone Corporation has a 3-kiln plant at Varnos, 5 miles north of Calera, which produces only lump lime. The Shelby Lime Works has a 6-kiln plant at Landmark, about 4 miles southwest of Saginaw, which also has no hydrator. The Longview Lime Works, which is owned by the same interests as the Saginaw Lime and Stone Company, operates an older plant at Longview, about 2 miles south of Saginaw, producing both lump and hydrated lime. The capacity of this plant was considerably reduced when the four gas-fired kilns now in operation at Saginaw were removed.

Interesting Program Is Announced For Allentown Regional Safety Meeting

As our readers are probably well aware, the Portland Cement Association is conducting a series of regional safety meetings. The next meeting will occur at Allentown, Pennsylvania, on May 23rd.

The following program has been announced:

1—A Few Words from Headquarters:

A. J. R. Curtis, assistant to general manager, Portland Cement Association.

Discussion.

2—Introduction of Delegates—1928 Trophy Winners.

3—The Quarry Industry of Pennsylvania, a motion picture; Thomas Quigley, chief of quarries, Commonwealth of Pennsylvania.

4—My Experience with the Safety Problem, John Roach, deputy commissioner of labor, State of New Jersey.

5—Round Table Discussion:

(A) Are We Getting the Most Out of the Significant Accident Bulletin?

(B) Value of Investigating and Analyzing the Cause of Accidents.

(C) How Can We Reduce the Fall Accident Peak?

6—Dinner—6:30 P. M. (Daylight Saving Time), Main dining room, American Hotel. Chairman, D. Adam, Lawrence Portland Cement Company.

9—Toastmaster, Major Renninger, president, National Safety Council.

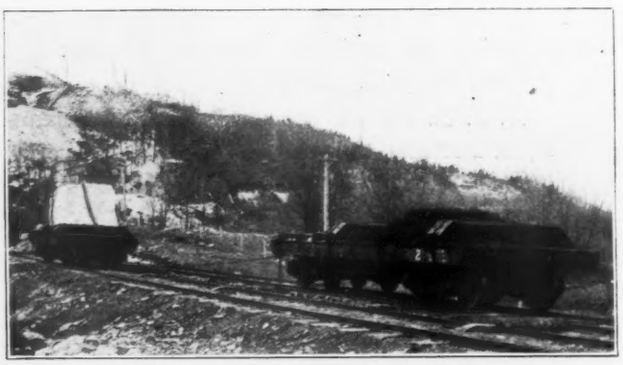
Electrical Braking Corrects a Potential Danger On an Inclined Cable Road

By F. A. WESTBROOK

THE following is offered as a practical illustration of the ease with which an operator may sometimes correct a hazardous situation without much expense or interruption to his operations.

The advantage of electrical braking has been demonstrated in a striking manner on the inclined cable road at the Denby, Vermont, quarries of the Vermont Marble Company. This incline is about one mile long and rises about 900 feet from the main-line railroad in the valley to the marble quarries on the side of the mountain. It is operated by a drum hoist driven by a 75-h.p. slip-ring, 220-volt, 720-rpm. Westinghouse motor, with Westinghouse drum-type controller. The hoist is equipped with air brakes.

Formerly a great deal of trouble was experienced with this motor, so that finally a careful investigation was made by the marble company's electrical men of the operating conditions. The flat car weighs about 10 tons and carries loads up to 50 tons. When a loaded car is let down the mountain with the braking all done by air, the motor, although electrically disconnected from the line, is still mechanically connected with the cable. The descent was frequently made in five minutes or less.



Danby Inclined Cable Road

This meant that the motor was run at something like five times its rated speed. Naturally it did not take long for it to be all torn to pieces and even to break its shaft, as has been known to happen.

The remedy was simple. The motor was connected to be run as a generator by the pull of the cable from the descending car which made it an effective brake, the current thus generated being returned into the power system. In addition to this the operator on the cable car has been provided with a tachometer so that he can now hold it down to the proper predetermined speed by means of the air brakes which, under these circumstances, are not greatly taxed. So now, instead of making the descent in five minutes, which is too risky anyway under the conditions, it is held back to 22 minutes, which does not in any way delay production in the quarry.

Universal Safety Series Radio Program

The widespread interest in the "Universal Safety Series" which is being presented to the American people by the National Broadcasting Company in co-operation with the National Safety Council is best shown by the imposing list of stations participating in the series.

The following stations are using part of the programs only, because of inability to change existing contracts:

WEAF	New York	KOA	Denver
WEEI	Boston	WHAS	Louisville
WTIC	Hartford	WOAI	San Antonio
WJAR	Providence	WRVA	Richmond
WTAG	Worcester	KSL	Salt Lake City
WCSH	Portland, Me.	WIOD	Miami Beach
WRC	Washington	KFI	Los Angeles
WGY	Schenectady	KGW	Portland, Ore.
WGR	Buffalo	KOMO	Seattle
WCAE	Pittsburgh	KGO	Oakland
WHO	Des Moines	WFI	Philadelphia
KSTP	St. Paul	WWJ	Detroit
		WCFL	Chicago

WSAI	Cincinnati (starts May 4th)
WSM	Nashville (two or three of the programs, possibly others)
WFAA	Dallas (first one or two programs possibly others)
WKY	Oklahoma City (part of programs)
WAPI	Birmingham (part of programs)
KHO	Spokane (began May 4th)

Dr. John H. Finley, editor of the *New York Times*, nationally known journalist, author and scholar, was announced as the speaker for Saturday evening May 25th, on the "Universal Safety Series" of radio programs. These talks are being presented to the American people by the National Broadcasting Company.

Honorable Robert P. Lamont, secretary of Commerce is to speak on May 11th, at 7:15 on "Safety As a National Problem"; on May 18th Madam Schumann-Heink will discuss "Safety in the Home."

The series will run up to and including July 13th. Other notables who will participate are Dr. Miller McClintock, Grover A. Whalen, Joseph E. Sheedy, Madam Ernestine Schumann-Heink, and Hon. James J. Davis, Secretary of Labor.

The Economics of Plant Location

BY C. H. SONNTAG

This is the final installment of this broad discussion. In the April 10 issue Mr. Sonntag presented the economic features that should be considered in selecting a plant location as they relate to markets, and some of the factors that relate to the availablity of raw materials. In the April 24 issue he finished his discussion of the various raw materials. In the following he concludes the general subject by studying the transportation, fuel, water supply, power, and labor factors.—Editor.

III. Transportation

IT SHOULD never be forgotten that perhaps the most vital factor affecting a purchaser's choice of a material from one source rather than another is the cost to him, delivered at the place where he desires to use it. In general, this tends towards uniformity of prices in the same market for products of the same grade or quality. Then the price that any producer can get at his plant is the delivered price less the cost of transportation. Hence a material that is excellent in itself may be so badly penalized by distance from market and high cost of transport as to be not worth while developing.

Transportation falls into three general classes—railroad, water and truck.

Railroad Transportation

A thorough knowledge of railroad traffic problems is a specialty in itself, and a discussion of it will not be attempted here. Mention may be made, however, of two tendencies that are apparent in present rate-making: one, the trend toward putting haulage on a mileage basis; the other, to put neighboring industries of the same class into groups, all having the same freight rate to markets where slight differences in hauling distance are not important.

It is essential indeed that a potential new producer make an exhaustive study of the freight situation in his territory before he spends money on plant. If he waits until afterwards, it may be too late, and he may find himself permanently handicapped in this regard as compared to his competitors.

There is considerable advantage in having a plant so located that it may get service from more than one railroad. In the first place, each railroad will give one-line haul to many points reached not at all, or only indirectly, by the other. In the second, during times of car shortage, competition between the roads is apt to insure a better supply of cars than would be forthcoming from either one if it were the only road serving the plant.

Water Transportation

Carrying materials by water is of course a matter largely of local conditions. In general, transportation by water is cheaper than by rail, and where loading and unloading do not absorb the difference, it is obviously the method to use.

Cement is now being handled on the Lakes in self-unloading boats, and these and the storage silos in the large cities have been described repeatedly in the press. An ocean-going bulk cement carrier is now proposed, and it is understood that special barges handling bulk cement will be in operation before long on the Mississippi river.

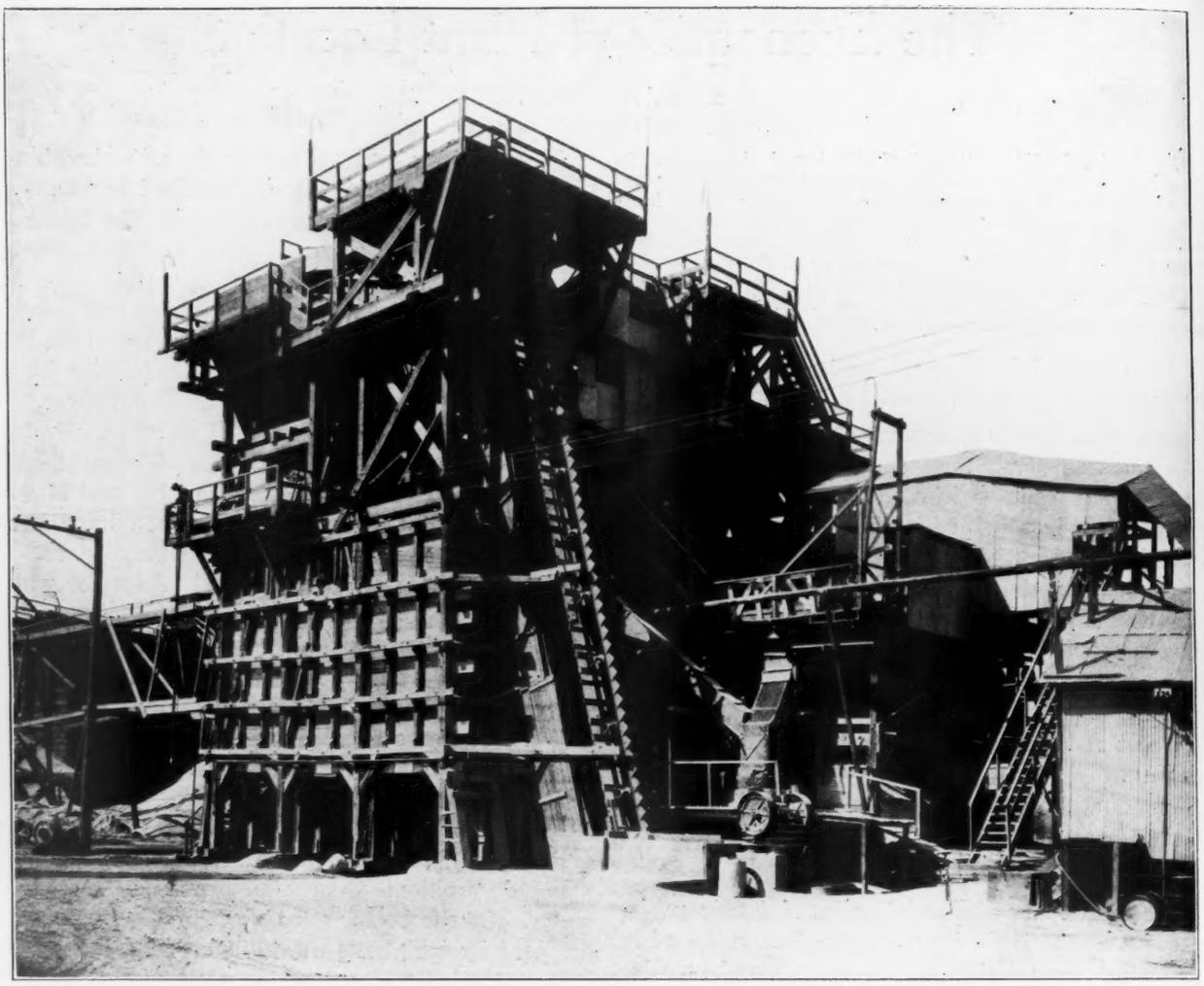
Most of the traprock crushed along the Hudson river goes to market in barges, and crushed limestone is now being barged on the Ohio and Mississippi rivers. Rip-rap stone has been handled in this way on the latter river for many years. It seems that there are other opportunities for water transport on our interior rivers that have not been taken advantage of.

When sand and gravel are dredged and pumped onto barges, these barges must usually be unloaded and the contents transferred to railroad cars, and this expense must be included in the cost of transportation to market.

The shipment of limestone for cement making and lime burning presents a somewhat more complicated problem than the problems suggested above. Of the better grades of limestone, over 40 per cent by weight is the invisible gas, carbon dioxide. If the stone were perfectly pure calcium carbonate, this amount would be 44 per cent. When the stone is shipped, this carbon dioxide adds its part to the weight on which freight must be paid. In the process of manufacture this carbon dioxide is driven off during calcination, and the only part of the stone remaining in the final product is the lime. It follows that, in selecting a site for our plant, we may locate it at the quarry, pay no freight on limestone, but pay to carry the finished cement to the largest center of distribution. On the other hand, the plant may be located at the logical center of distribution, and freight paid on the raw materials to the mill.

Because of the presence of carbon dioxide, it takes about 525 pounds of reasonably pure limestone to make a barrel of cement weighing 376 pounds, and freight must be paid on 525 pounds instead of about 70 per cent of that amount. As against this it should be remembered that limestone is a cheap commodity, not affected by rain, and may be shipped in open cars or barges at a low rate. Cement must be protected from the weather, and is shipped in the best class of box cars the railroads have, and of course it moves under a higher rate than that applying to limestone.

It follows that, when there are the above two alternatives as to the location of a cement mill,



A Permanent Sand and Gravel Plant. Built to Supply a Market for a Period of Years

one of the factors influencing the choice is the comparison of a low freight rate on a high weight of stone as against a high rate on the lower weight of cement.

The same considerations apply to the location of a lime plant where the matter of transportation of the stone is a possibility.

Truck Transportation

In their present stage of development, the use of trucks is limited, for the class of materials that we are considering, to distances of 20 to 25 miles. The great majority of hauls will be shorter than this.

If a plant can be located close to a large city, or among a group of smaller communities that in the aggregate make up a large-consuming public, this plant will have a definite advantage over more distant competitors in that customers can get cement as and when they want it, in the desired quantity and no more, and delivered directly at the job without warehousing or intermediate handling. This is one reason why storage silos and packing houses for cement are being built in the large cities, even though the mills themselves may be at some distance. It is difficult to evaluate the effect of this facility of delivery on the customer's mind, as it contains elements that can hardly be reduced entirely to dollars and cents.

Modern highway construction now commonly depends upon delivery of materials to the actual site of the work by means of trucks. When deposits of suitable aggregates are found on or near the highway, there is always the temptation to use them rather than to have them shipped to the nearest railroad siding. The latter course means that the profit of the distant producer and railroad freight must be paid and the cars unloaded, while the trucking expense will probably be about the same as it would be from a local operation.

It costs money to set up a gravel washing and screening or small stone crushing plant, and to open up the deposit. These costs can be fairly well approximated, especially if previous experience along the same lines has been had. The road job constitutes a temporary market, and this has already been discussed. Knowing the tonnage to be supplied, it is a matter of rather simple figuring to learn whether the cost of setting up, operating and dismantling a local plant can be offset by

Dredge Boat and Nozzle Ladder, Koenig Coal and Supply Company, Oxford, Michigan

the saving in first cost and freight on material shipped in. If plenty of water is at hand, and the gravel is free from clay and easily washed, and the job is large enough to offer sufficient tonnage, the operation will probably pay, but the matter should be carefully investigated before setting up a plant.

IV. Fuel

Except for cement and lime making, fuel is not a very important part of operating costs in the industries we are discussing but, in these two, it is a major item. Its cost, delivered at the plant, should therefore be looked into along with the other factors that influence plant location.

Many lime burners have their preference for some particular coal, for which they are willing to pay a premium, and frequently do so. It seems likely that this attitude will be changed as the lime industry comes under more exact technical control.

In cement making, all coal not burned under boilers must be ground to a fine powder. It has been shown that the sulphur and ash in coal, even when present in more than average amounts, do not affect the burning process or the quality of the product adversely, so that a coal of almost any grade except anthracite may be used. The question is simply how many heat units can be bought for a dollar, and this involves both cost at mine and freight rate.

In some parts of the country both high grade and low grade coals carry about the same freight rate to consuming centers, but are sold at different mine prices. Given this choice, the purchaser can readily determine which of these fuels will give him the most heat for his money. The cement maker is not interested in the content of moisture, sulphur or ash, except as they affect the heating value of the coal. Other users will be concerned with the action of the coal when burned on grates.

In some parts of the country natural gas and oil are competitive with coal. Since cement and lime burning and boiler firing can be carried out on practically the same heat consumption, regardless of whether the heat comes from coal, oil or gas, here again it is only a question of how much heat can be bought for a dollar, including all costs, the extra one in the case of coal being the cost of firing boilers or of pulverizing the coal for kiln fuel.

V. Water Supply

All of the industries we have in mind are vitally interested in an ample water supply. Sand and gravel operations located on lakes or streams will of course have all the water they need, but when it is proposed to take gravel from glacial hills, water must sometimes be pumped some distance.

The cost of the pump and pipe-line is apt to be considerable, as also will be that of power and attendance. It should be ascertained whether the working of this particular deposit is justified when this added expense is taken into consideration.

The flood plains of our larger rivers frequently have a heavy layer of gravel just above the rock floor. It is often feasible to sink large diameter wells to this gravel and fit them with motor-driven centrifugal pumps. Flows of over 1,000 gallons per minute are not uncommon from such wells, but their cost, ready for operation, is rather high.

For a comparatively limited demand, or for a temporary supply, it may be best to buy water from a public utility company. It should be remembered that the unit cost of such water is apt to be high, and the possibility and cost of a private supply should be looked into carefully.

No industry needing large quantities of water should be located definitely unless it is certain that the required supply can be had at that place at reasonable cost.

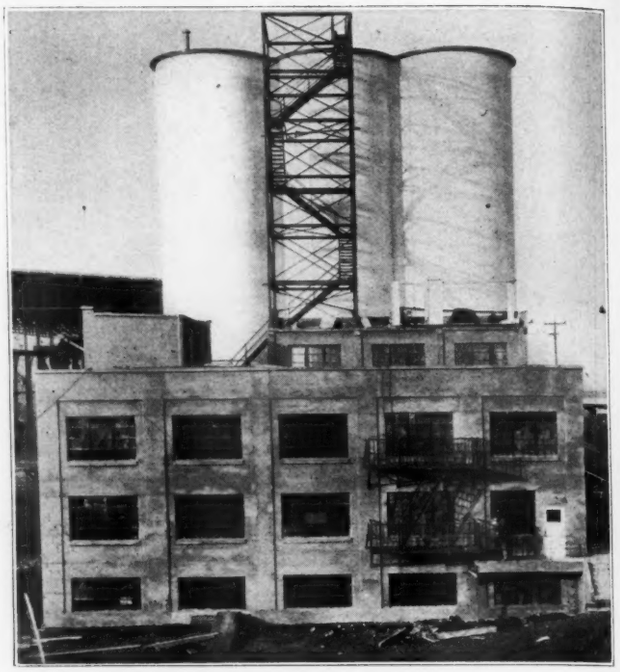
VI. Power

This may be either generated on the premises or purchased from a public-utility company. If the former, a thorough study is needed, and the question becomes one of plant design rather than location; but a decision must be made as to whether power is to be generated or purchased, and sometimes there is no choice.

If public-service lines are close enough to serve the project, it will require less intital investment to buy power than to make it. The rates charged by the companies are fixed by the utilities commissions of the various states, and can be had on application, so that some idea of what the power will cost may be had. A thorough understanding of these rate schedules requires considerable study, and is outside the scope of this paper.

When power must be generated on the premises, some thought must be given to the means of doing this. For temporary set-ups that must be erected with as little investment as possible, second-hand return-tubular boilers and common slide-valve engines are always on the market. No boiler should be bought that is not acceptable to a reliable insurance company. Steam hoisting engines for operating drag scrapers and slack-line cableways are also commonly to be found in the used machinery field.

Steam may be used for permanent installations also, and many of these are running, but the Diesel oil engine is becoming such a reliable unit and furnishes power so cheaply that it is coming into extensive use.



Baghouse with Cement Storage Silos in Background

VII. Labor

It is worth while to give at least a passing thought to the labor that will operate the proposed plant. In the quarries of cement, lime and crushing plants there will be needed a certain amount of unskilled labor, and some around the rest of the works. The balance of the employes will be machine tenders and repairmen, and will be considered in the skilled class. Sand and gravel plants do not use a great many men, and most of them are above the grade of unskilled.

If living conditions for the employe and his family are poor, a high labor turn-over is inevitable. It may be, and often has been, necessary to lay out a village and to build houses in which the men may live comfortably. If this must be done, the cost is properly a part of the plant investment, and subject to overhead charges which increase the cost of production.

Conclusion

In what has gone before, no attempt has been made to describe in detail the reasons that led to the location of any particular operation where it is. It is felt, however, that the principal points that bear on the subject of plant location have been touched upon in such a way as to make them presentable to promotors or industrialists who wish to give careful consideration to all the factors that affect this matter, which is so vital to the success of many an undertaking.

Central Plants for Manufacturing and Delivering Ready-Mixed Concrete—II.

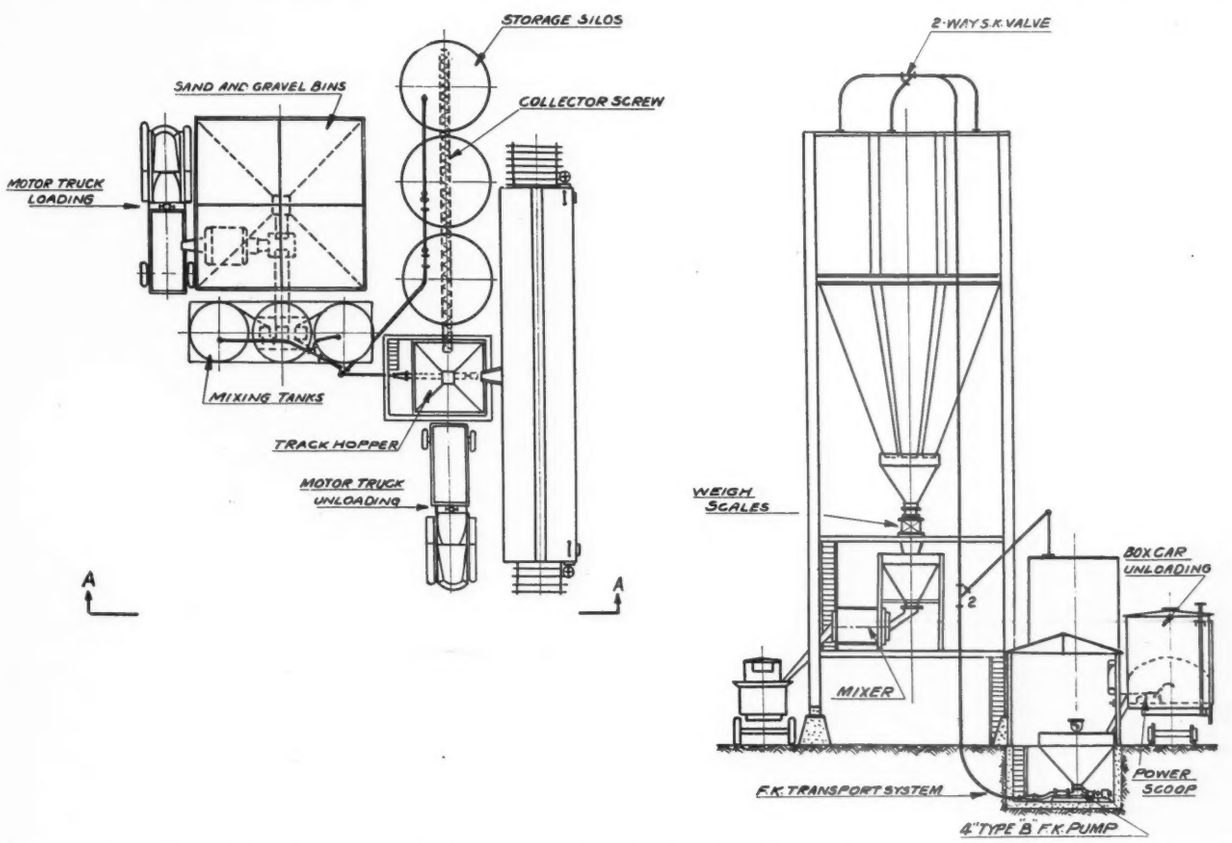
A Discussion of Design and Equipment for Central Ready-Mix Concrete Plants, Especially Referring To Possibilities for Operators

By J. O. DURKEE

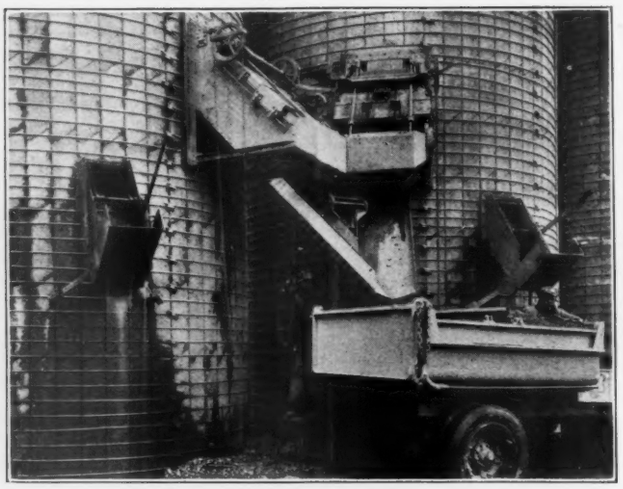
THE former installment was devoted to the discussion of the existence of profitable ready-mix plants, their opportunities, feasibility, location and their probable acceptance by contractors. This section is concerned with the design, cost, construction and equipment for such plants. The concluding installment, which will appear in an early issue, is concerned almost exclusively with methods of transportation, including mixing in transit and at the job.

The capital required to start a central mixing plant will depend on the type and size of the plant and the trucking equipment required. It depends to a great extent on just how the operator is equipped with regard to storage capacity and the feasibility of adapting it to the new arrangement. In some instances, operators are using batching arrangements and are batching aggregate for the trade according to specifications, the cement and water being added to the portable mixer on the job. The cost to such operators will vary as the equipment in use may be applied to the ready-mixed plant.

According to authorities on the subject, the construction of an entire plant has been accomplished with an outlay as low as $20,000, while others have started on $40,000 to $50,000 and a large plant may represent an outlay of $450,000 to $500,000. The Blaw-Knox Company has found, in actual practice, that a plant for a normal output of 200 cu. yd. per day with a peak possibility of 300 cu. yd., will cost approximately $72,000. This will consist of 110 tons of storage room, a one-cu. yd. mixer, weighing batchers for aggregates and cement, special water measuring equipment, a system for unloading bulk cement, an elevator for aggregates, a 2-car capacity cement house, eight 2-cu. yd. trucks and eight 2-cu. yd. agitator truck



A Composite Diagram of a Ready-Mix Plant, Arranged to Supply Bulk Cement from Either Box Cars or Covered Dump Trucks



Neff and Fry Bins, Equipped with Superior Batchers in Plant of Chillicothe Sand and Gravel Company

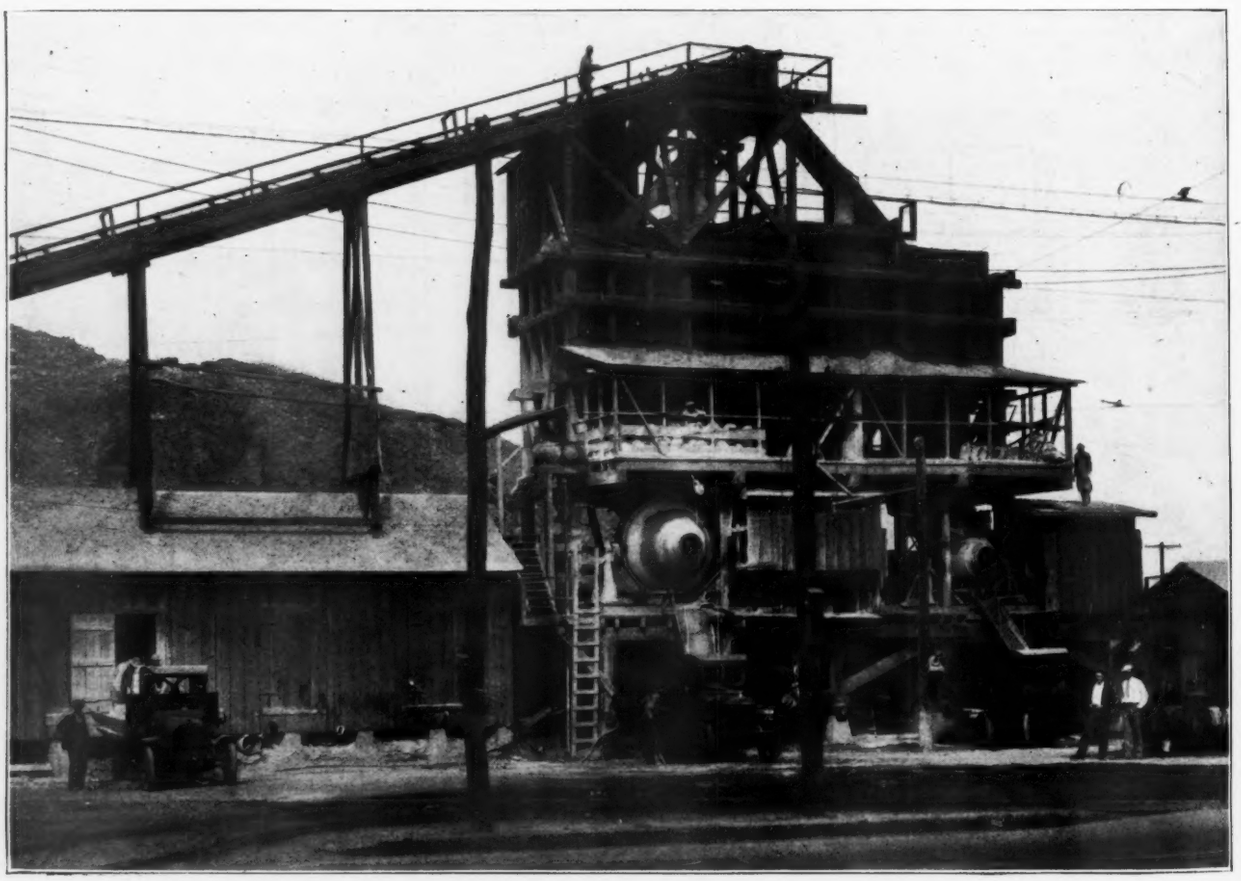
bodies. The truck and body equipment constitutes 85 per cent of the total estimate. For a plant with a normal capacity of 400 cu. yd. per day with a peak capacity of 600 cu. yd. the estimate by the same company is approximately $144,000. These costs are based on plants designed to mix the concrete at the plant and deliver in an agitator truck but would hold approximately true for plants designed to batch the aggregates and cement, the water to be added and the mixing done in transit.

It is difficult to determine the required capacity of the plant to be installed unless local conditions are known. Most plant owners believe that the capacity of the mixer and the capacity of the truck for hauling should be about the same and if any difference, the mixer should be about one-half or one-third the size of the truck rating. A 1-yard mixer will supply 200 cu. yd. per day, but where a larger quantity is desired, it will require a larger mixer.

The three general methods of arranging ready-mix concrete plants are a batching plant and mixer with trucks for transporting concrete to the job; a batching plant and mixer, with special trucks of various types, that prevent segregation during transporting and a batching plant, with truck mixer in which materials are transported to the job and mixed or mixed in transit.

It is difficult to assume which one of the three methods of handling concrete is the most practical as this will depend on conditions. In some cases a combination of two of the systems would seem advisable and frequently the batching aggregates for delivery is retained as a part of the business of a ready-mixed plant.

Where the concrete is to be hauled in ordinary trucks, the principal limitations are the length of the haul and the class of concrete that may be hauled without segregation. With this method, it is difficult to haul concrete with a slump of 3 to

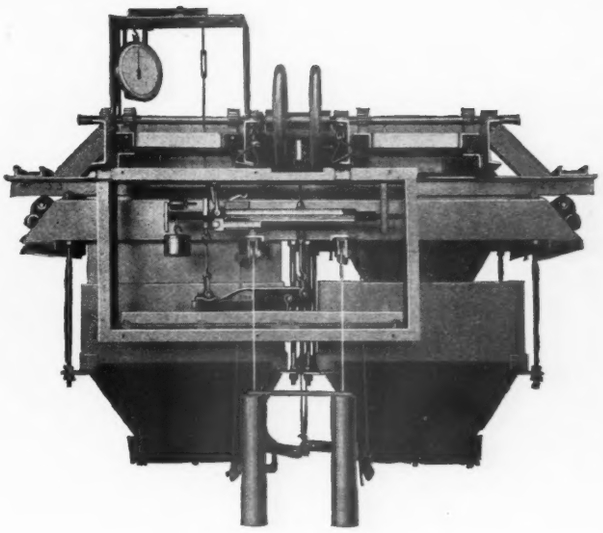


Sloss-Sheffield Ready-Mix Plant at Birmingham, Ala.

4 inches for much over a mile without causing segregation.

The second plan of having a central mixing plant, a batcher plant and a stationary mixer appears to be able to conform more easily to specifications and modern requirements for quality concrete. This system centralizes the measurement of all the components at a central plant. Here the aggregates, cement and water, are, or should be, accurately measured by experienced workmen and charged into the mixer. The mixing action may be continued for the exact period of time required by the specifications and before it is discharging into the truck. The truck driver has nothing to do with the concrete except to haul the load to the job and discharge it. The truck driver is not responsible for adding the correct amount of water nor controlling the mixing time.

A batching plant with truck or transient mixers offers many advantages in suburban districts, where the length of haul is excessive. It eliminates several problems involved in delivering concrete exceptionally long distances. It possesses all of the advantages of the control of dry materials, but not of the water or time or mixing. The latter operations are in the hands of the driver in transit mixing or someone on the job. The transportation and maintenance cost is said to be higher with the truck mixer than with an ordinary truck.

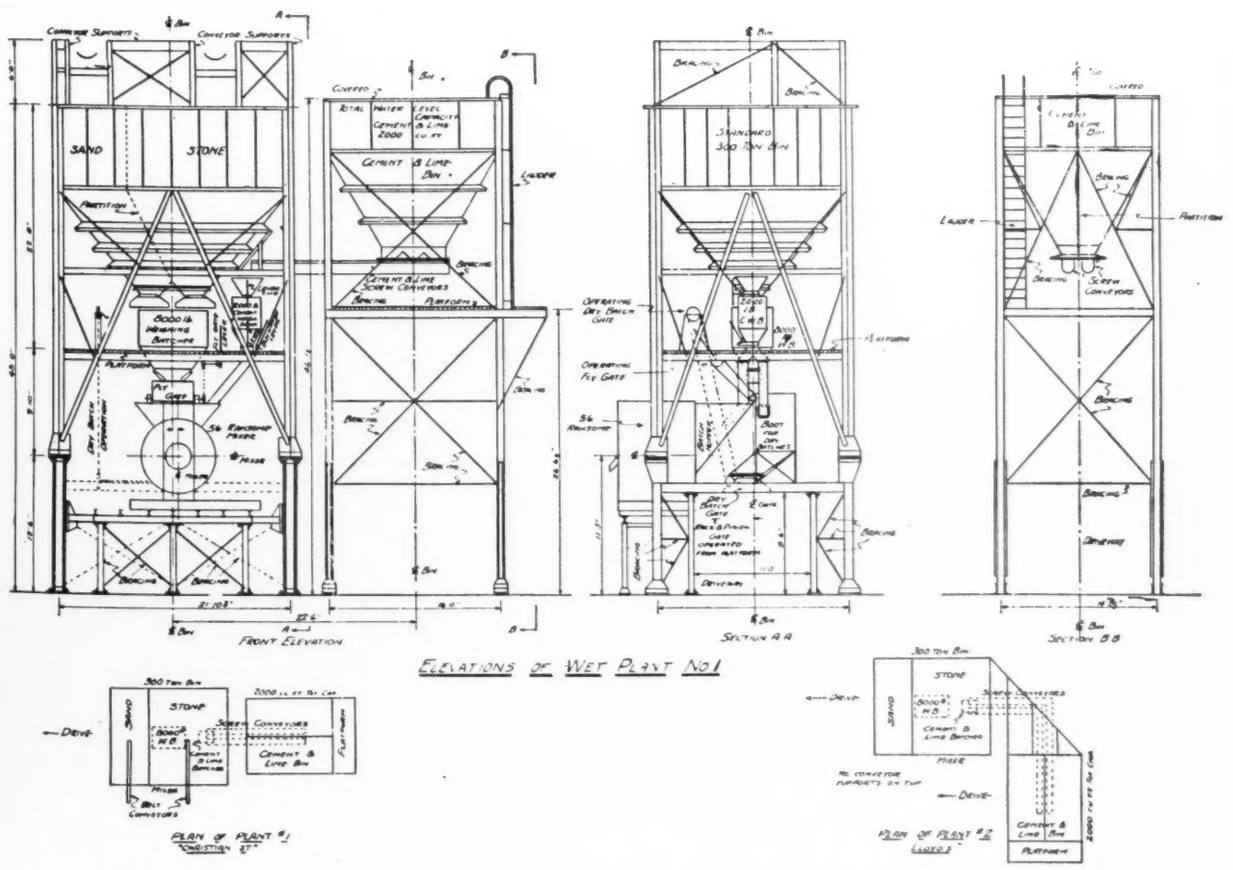


The Erie Weighing Machine

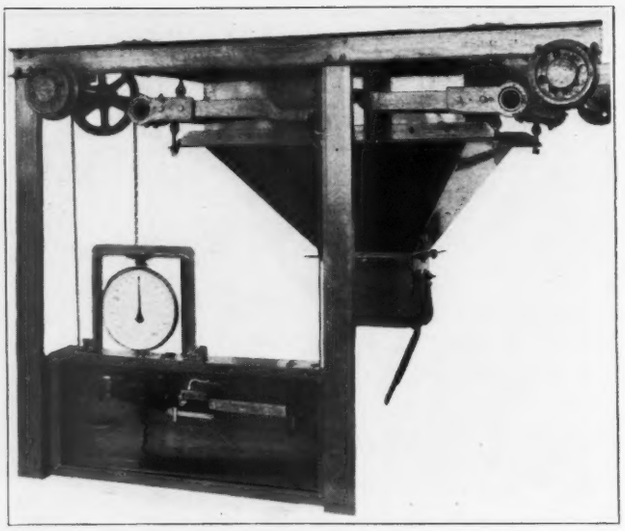
Several operators have installed a combination of the central mixing plant and the truck mixers, the latter being used for the excessively long hauls and for jobs where the plasticity of the concrete is important.

Design and Construction of Plant

With reference to the construction of ready-mixed plants, there are almost as many different



Design of the Central Mixing Plant for the Van Scivor Corporation, Philadelphia, Pennsylvania
The Consolidated Weigh Larry for Batching the Concrete



The Consolidated Weigh Larry for Batching the Concrete

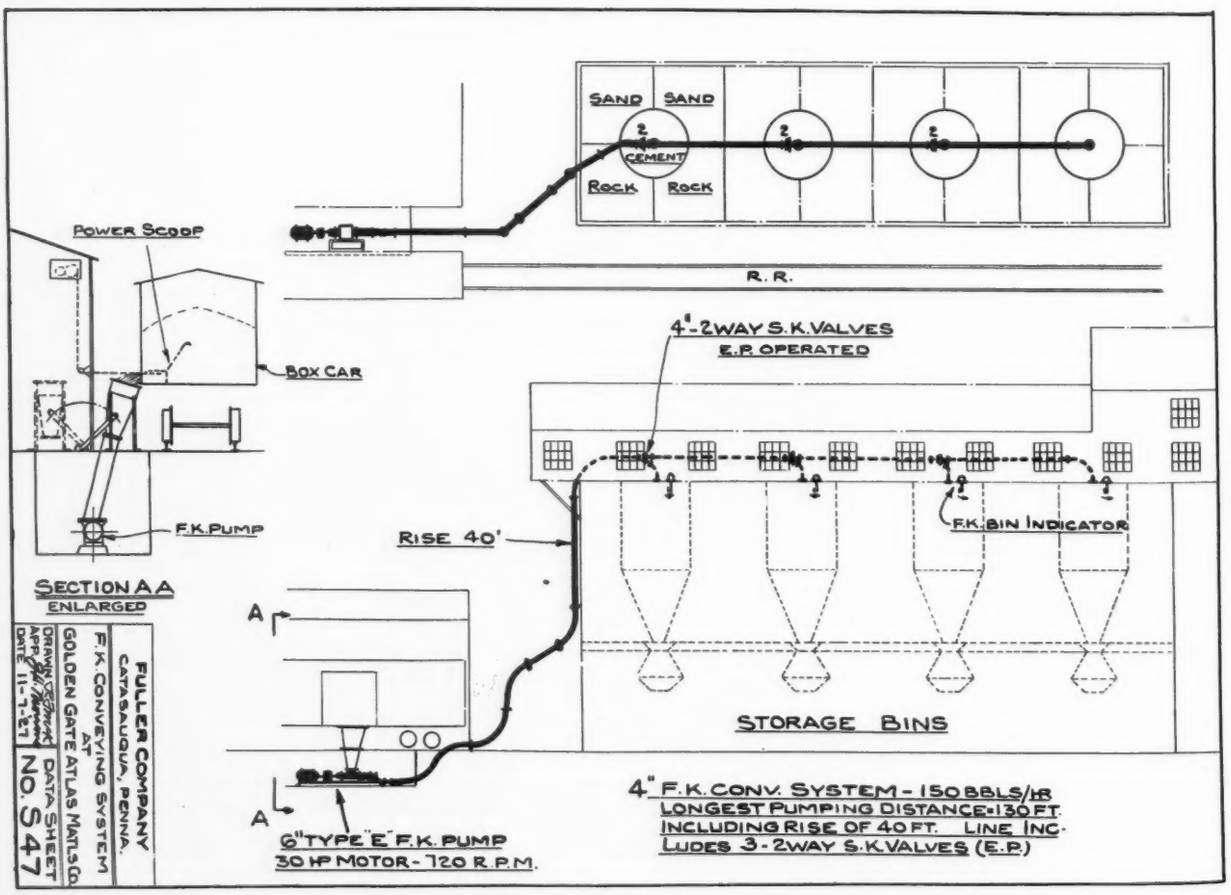
ideas involved as there are interested individuals, but the gravity type is the most common form. A structural framework, preferably enclosed to protect the workingmen and equipment, supports the plant and machinery at different elevations, the ground level being devoted to a driveway preferably running under the mixer. On the first floor above the grade are the mixer and motor. Above this is the charging floor, where the operator controls the proportioning of the materials and operates the plant. The storage bins should be located over this floor. The total height of the plant generally ranges between 40 and 60 feet.

The plant is usually built with overhead storage bins. Aggregates are elevated to the bins by belt or bucket conveyors or a stiff-leg derrick or crane is used for this purpose. Special handling equipment such as a pumping system or conveyors are used to elevate the cement.

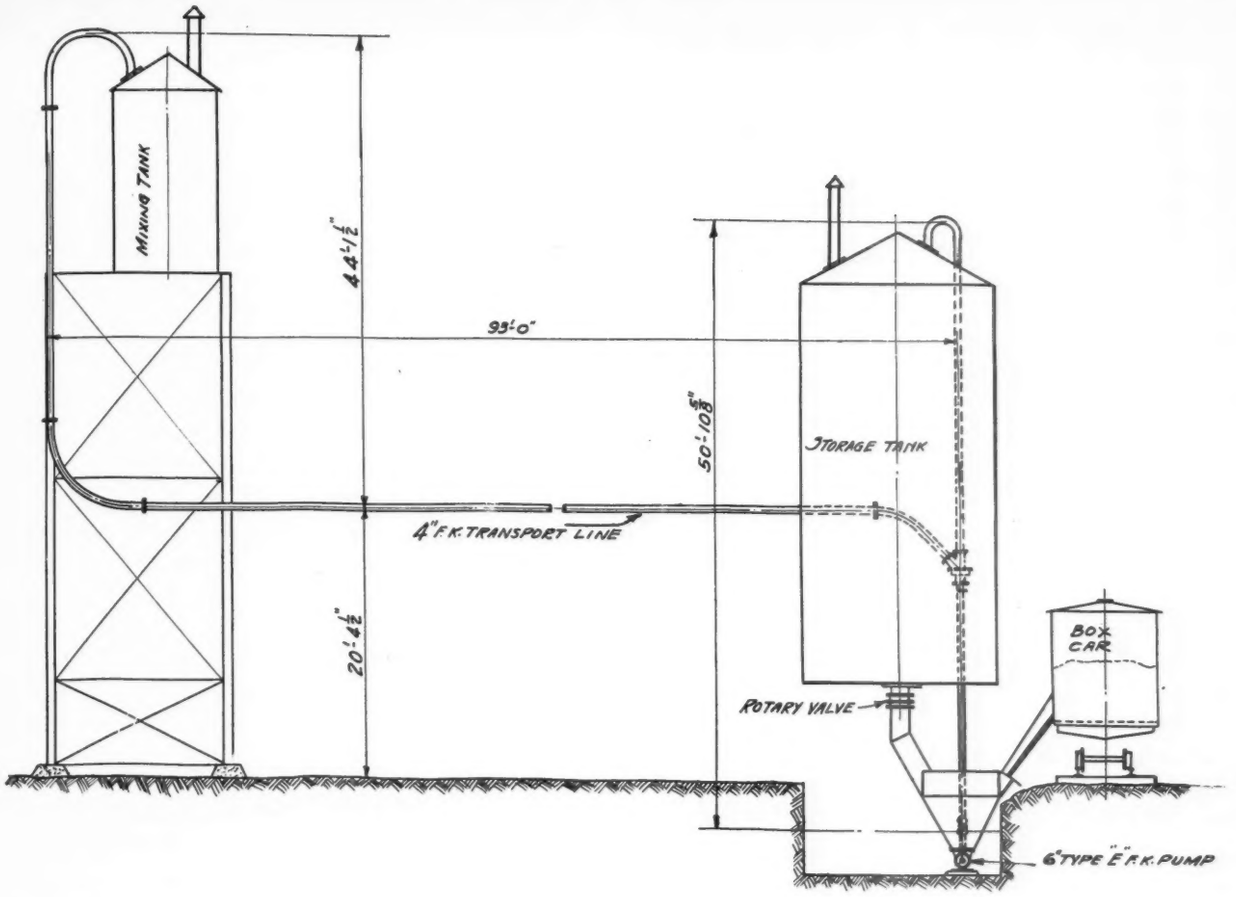
The materials, sand, stone and cement, flow by gravity into the different weigh hoppers which, in turn, empty into the charging hopper of the mixer. Water is piped to a measuring device where the quantity entering the mixer can be accurately controlled. The mixer should be sufficiently elevated to dump into the trucks.

There are as many types of bins used in central mixing plants as there are impressions of the superiority of each. Among this number, the Butler Bin Company has been installing its compartment steel bins at central plants in different parts of the country which include weighing hoppers for cement and aggregates in which all control gate levers for charging and discharging the weighing hoppers, water control, mixer charging and discharging are banked for one-man control.

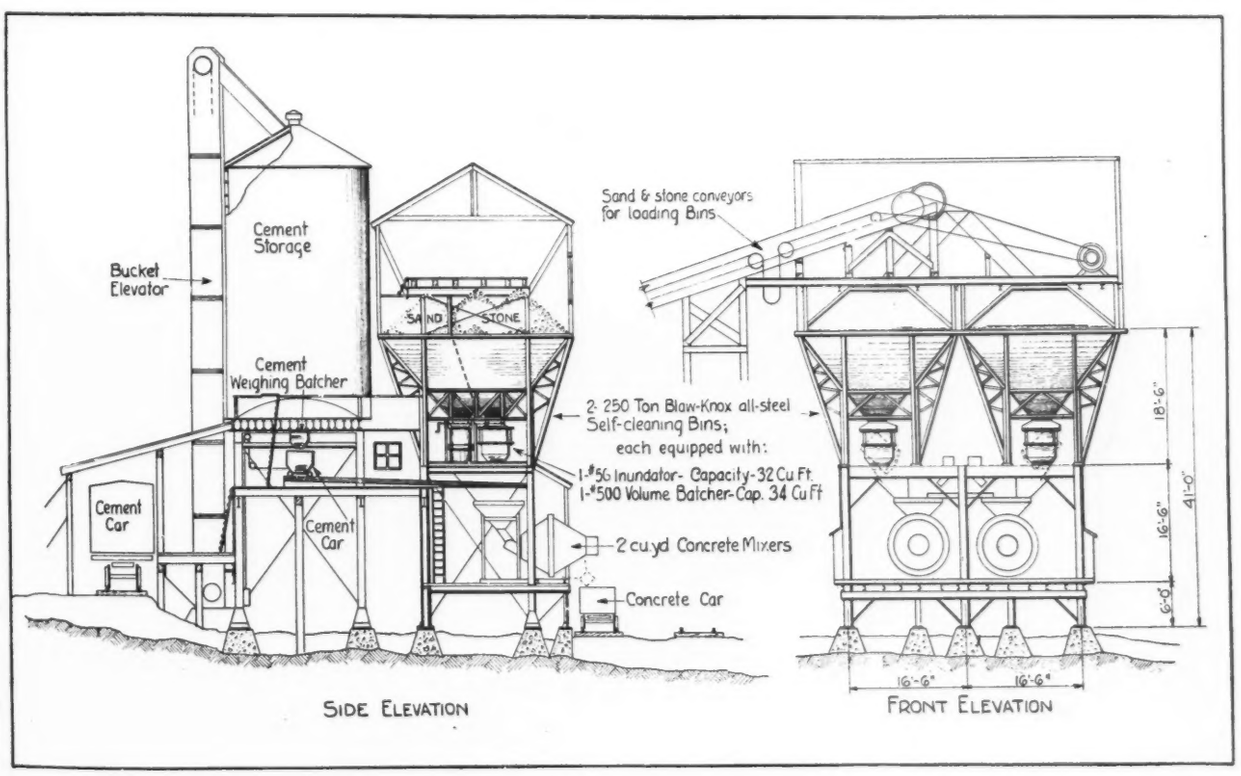
Another steel compartment bin is being placed in many plants by the Blaw-Knox Company either



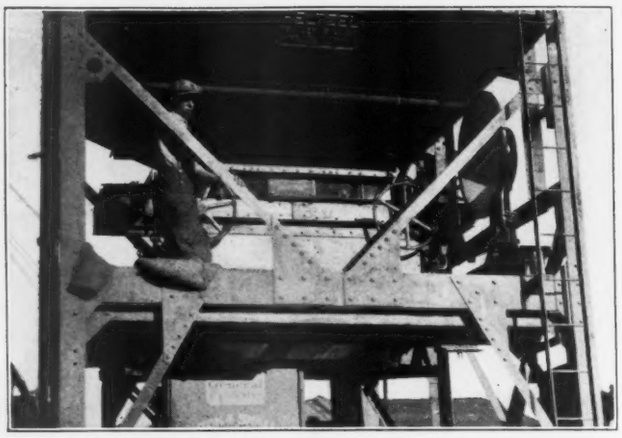
A Schematic Diagram of a Ready-Mix Concrete Plant, San Francisco, Calif.



A Design of a Philadelphia Plan Which Has Fuller-Kinyon System for Unloading Bulk Cement at the Rate of 115 Barrels per Hour. A Two-way Valve Is Used for Controlling Branch Line to Mixer



Design of Plant for Ready-Mixing Which Uses Blaw-Knox Steel Aggregate Bins, Inundators, Stone Batchers, Water Measuring Equipment and Cement Weighing Equipment. The Inundators and Stone Batchers Have Sufficient Range of Capacity to Provide for the Various Mixes Used with a 2-Cu. Yd. Concrete Mixer



Heltzel Weighing Agrabatcher. The Dial Is to the Right with the Operator Standing with One Hand on the Sand Control Wheel of Upper Gate, the Wheel Controlling Stone Gate Is to the Left

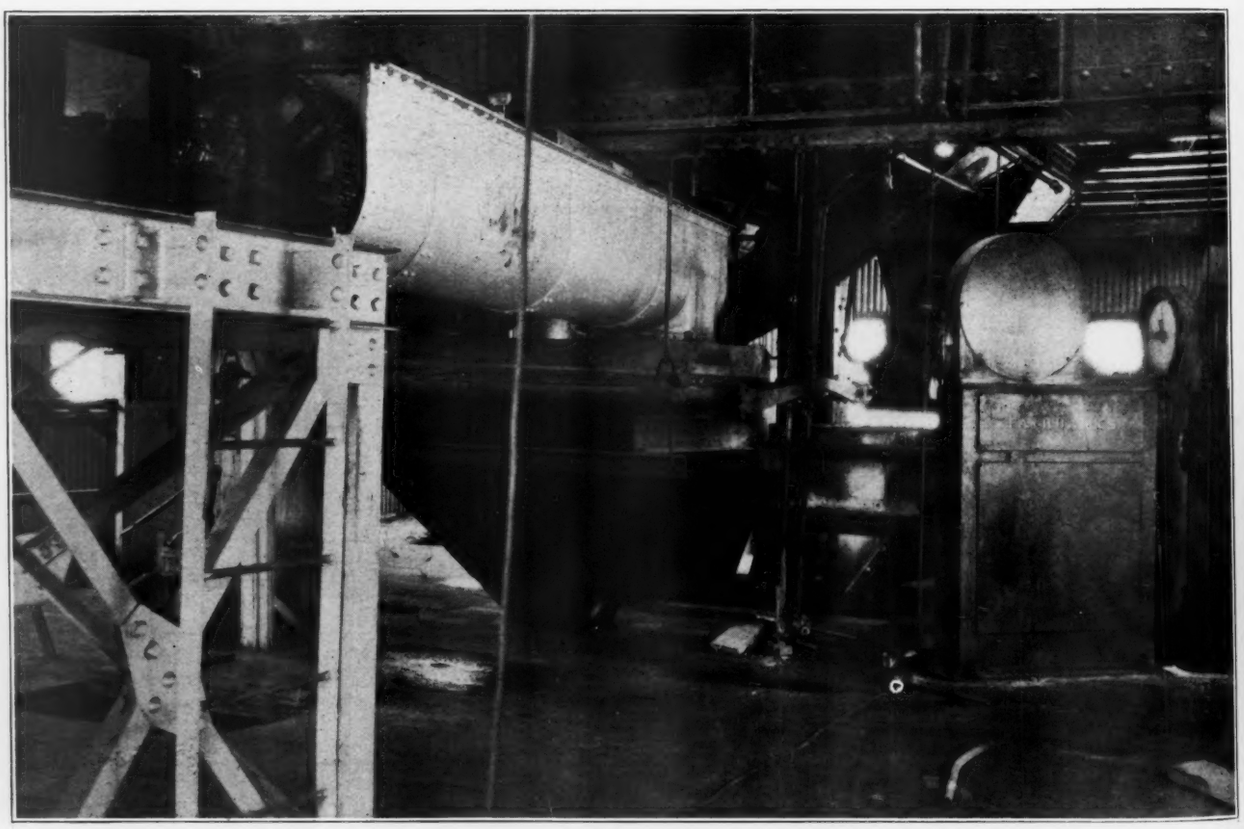
as separately designed or in connection with a complete plant designed with all the necessary equipment installed and operating as a unit. Special attention is directed to the plant of the Avril Tru-Batch Company described on page 51 of the April 10 number of PIT AND QUARRY and of the Ready Mixed Concrete Company plant on page 43 of the March 27, 1929, number of PIT AND QUARRY.

Steel bins of different designs are being manufactured by different companies to meet the growing demand of central mixing plants. These make special claims for ease of installation and general mobility together with the ease of attaching different batching arrangements in ready-mix plants.

Different manufacturers of concrete bins are much interested in the central mixing field. Among these is the Neff and Fry Company with its bins of the super-concrete stave design. For these bins, especially or where desired, the Superior Engineering Works has designed and is installing the Superior silo batcher. These bins are described on page 81 of June 20, 1928, issue of PIT AND QUARRY. Burrel Engineering and Construction Company is designing central mixing plants in which the silos are described on page 69 of the February 13, 1929 issue of PIT AND QUARRY.

Of the many devices for elevating the material to the bins, only a limited number can be considered. For elevating aggregates many different types of belts, elevators, cranes and derricks are in most common use, while for elevating cement, elevators, conveyors, pumps or pneumatic systems are usually installed. Conditions surrounding the operation must govern the different methods of raising the constituents to the bins. As for cement, the method of raising it to the bins will depend largely on whether it is purchased in bags or in bulk carload lots.

There are two particular methods of batching, by volume and by weight. The volumetric method is not considered so accurate as by weight and will have less chance of passing the rigid tests and specification requirements of many engineers on

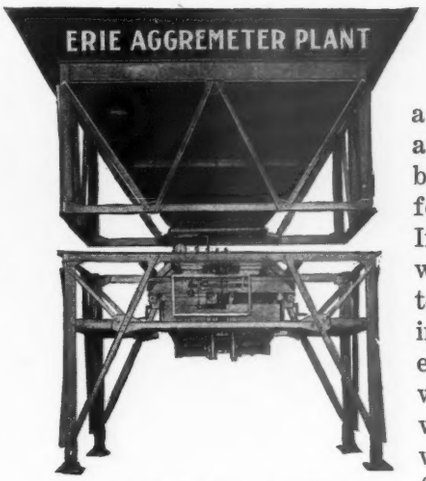


A Cement Screw Conveyor With Weigh Hopper and Fairbanks Scales to the Right

construction work. In many cases, batching by volume is being done especially where the aggregates are batched at the plant, the cement and water being added and the mixing done on the job.

A careful survey of concrete mixing points out the necessity of compounding by weight instead of compounding by volume, as has been done heretofore. Many sand, gravel, and concrete manufacturers have recognized this fact and have now adopted equipment for proportioning by weight, as volumetric measuring is particularly inaccurate in connection with sand. This is because of variations in what is known as bulking of the sands. Due to the variation in moisture content of the sand, this bulking often varies as much as 40 per cent and therefore the method of compounding by weight is more essential than is generally recognized. The following will illustrate what is known as bulking:

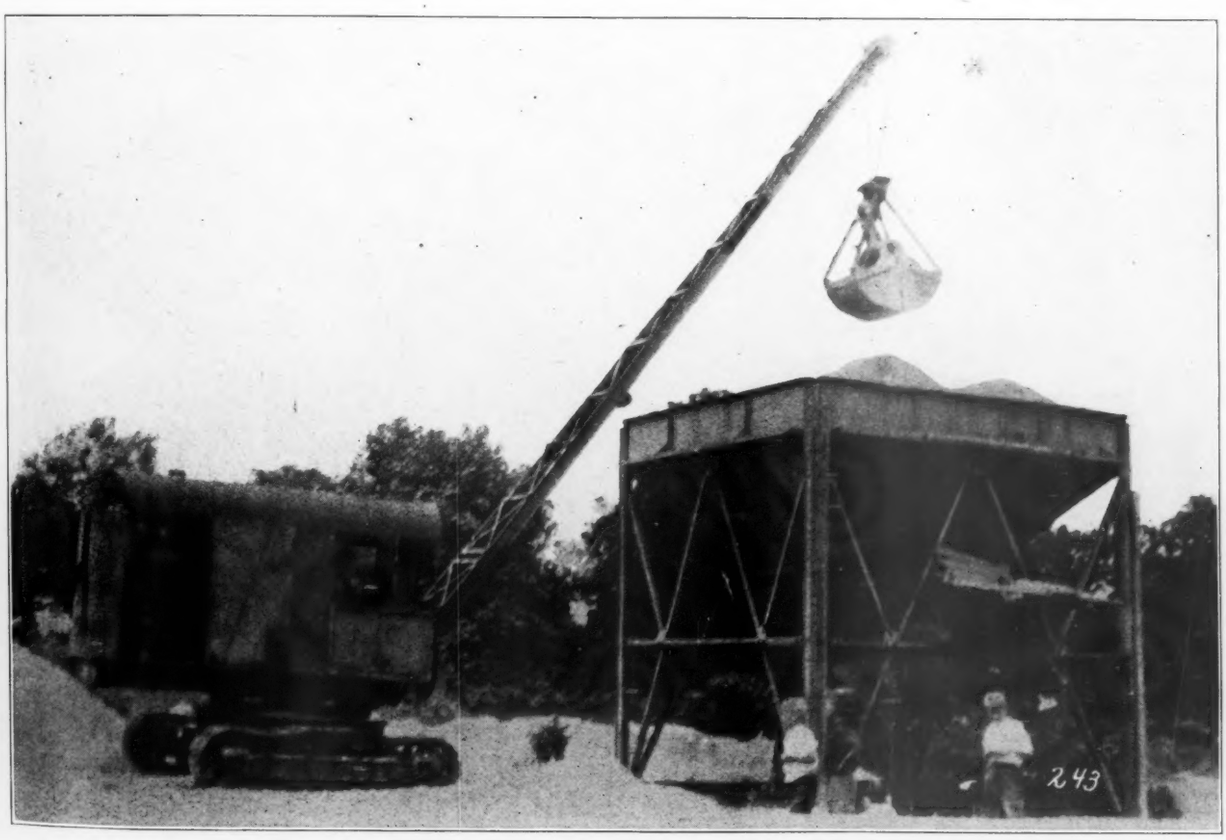
If sand is permitted to flow slowly for a short distance from a bunker into a container, the bulking will run relatively high. By this is meant that there is considerable space between the grains of sand and it occupies considerable space per pound. Therefore it requires more room in the container and naturally piles up higher. According to the volumetric measurement, the container filled with sand would contain a certain proportion of the mix; but if the same sand were deposited from the hopper to the same container in a heavier stream of less slope and allowed to drop a greater distance, there would be a tendency for for it to pack. In this way, it would be possible to put more sand into the container. In other words, there would be more weight per cubic foot. The use of scales will invariably eliminate this condition.



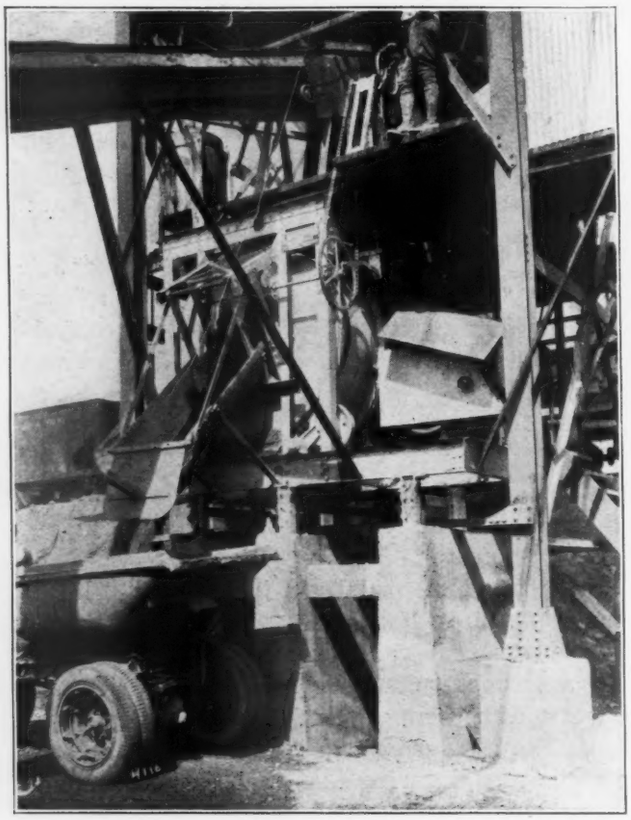
Type of Aggremeter Plant

There are also variations in cement. This is usually put up in 100 pound sacks, but actual tests have shown that variations of from 1 to 4 per cent are common. Cement absorbs considerable moisture after being packed, approximately 2 per cent. The regular custom is to count the number of sacks used, figuring that each sack will weigh 100 pounds.

Because of these variations, an inferior grade of concrete results. There is one best formula for good concrete and the only way is to proportion the ingredients accurately. This can be done only



One of the Six Speeders, Owned by the South Shore Motor Transportation Company, Patchogue, Long Island, Batching and Loading Into Trucks

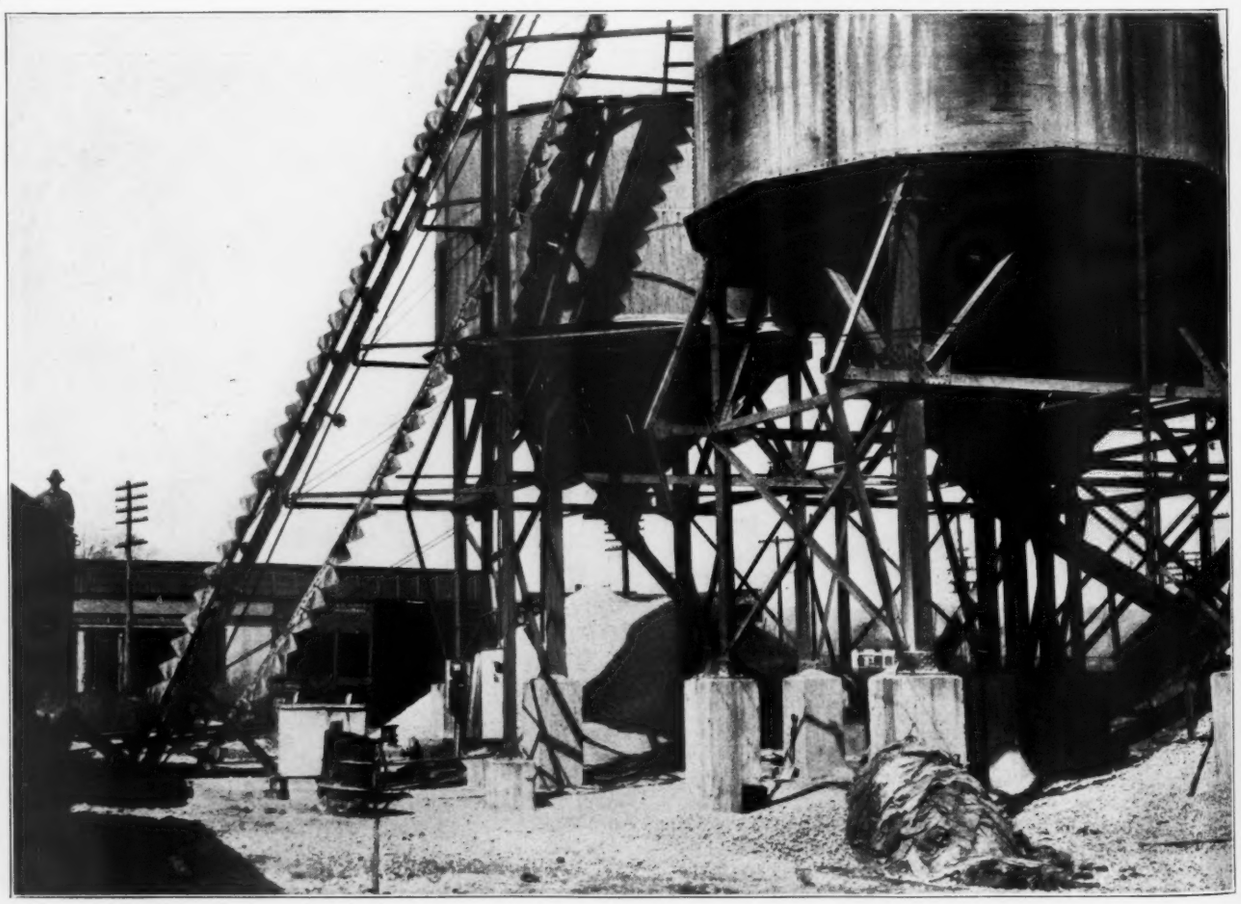


A 56-S Lakewood 2-yd. Mixer in a Central Mixing Plant of the Metropolitan Concrete Company, Cleveland, Ohio

by weighing on an accurate scale at the point where it is proportioned or mixed. Not only will accurate weighing equipment be a responsible factor in increasing the quality of a product, but it will reduce costs to an extent that the saving would be almost inestimable. The growing demand for concrete construction offers a new unlimited field for weighing devices. Accuracy, dependability, and rapidity in weighing are three factors of paramount importance in automatic weighing equipment which should always be considered.

The central mixing plant has caused the advent of many types of weighing machines as volumetric batching has been found unsatisfactory to meet the exact specifications of many engineers. These weighing devices are much more satisfactory when so arranged that one operator can see the dials and operate the levers from one bank and be easily and quickly attached to almost any bin. The operator, who must be an exceedingly reliable man, can be depended upon to produce a uniform and desirable concrete to meet the required specifications on the job in hand.

The engineering department of The Consolidated Concrete Machinery Corporation has designed a portable weigh larry that has the following specifications and that is said to result in accurate measurement of batches: The frame of this larry is constructed of channels and angles and the hop-



Columbus Elevator and Blaw-Knox Circular Bins in Plant of Avril Tru-Batch Concrete, Inc., Cincinnati

per proper is of No. 10 gauge, Keystone copper steel with welded seams. A duplex valve is made a part of this hopper, which operates through a hand lever.

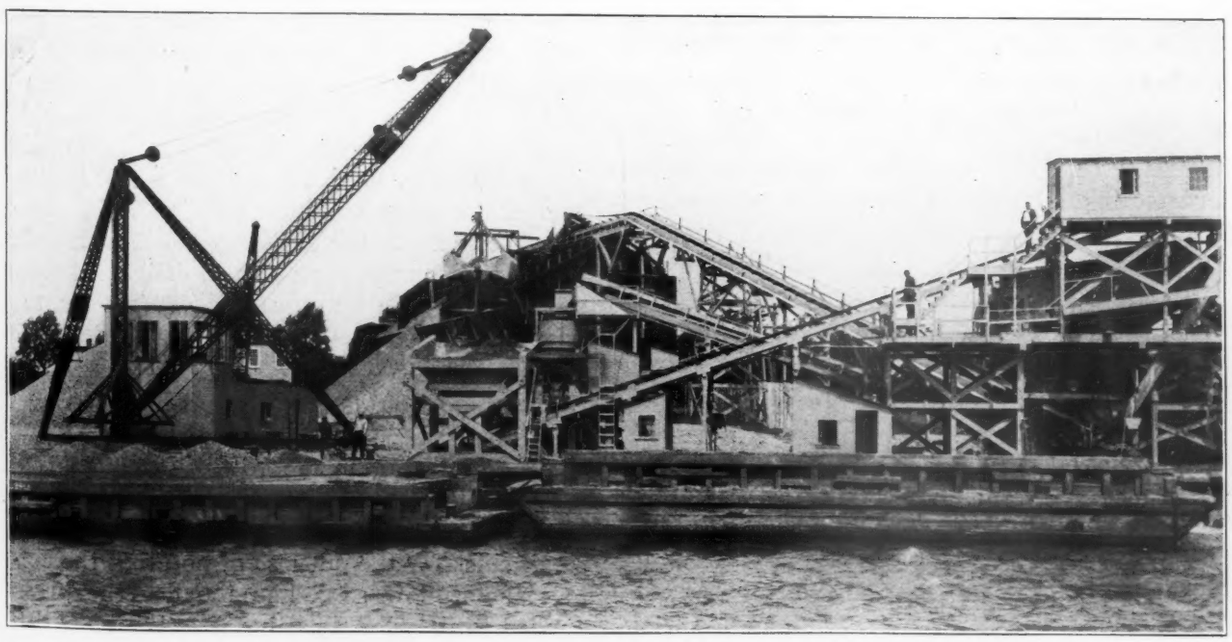
The complete larry is mounted on two trucks, each consisting of two 9-in. diameter, single-flange, chilled-rim wheels, mounted on 1 15/16 in. over-all shaft. This shaft is carried in a pair of Hyatt roller bearings, making it easy to move the weigh larry back and forth between the mixer and the bins. The scale, as used, is a combination beam scale and dial scale, which makes it possible to weigh two or three aggregates on the dial scale without shifting the beam scale. The purpose of the beam scale is to set the tare weight of the hopper.

The weigh larry installation shown has great flexibilities, as the equipment can be made to serve a number of storage bins containing materials of different character and can deposit these materials wherever they are needed. For instance, in a plant where there are bins containing crushed stone of various sizes, sand, gravel, crushed slag and so on, this equipment would enable the operator to withdraw these various materials in such quantities as he desires and proportion them according to any formula laid down.

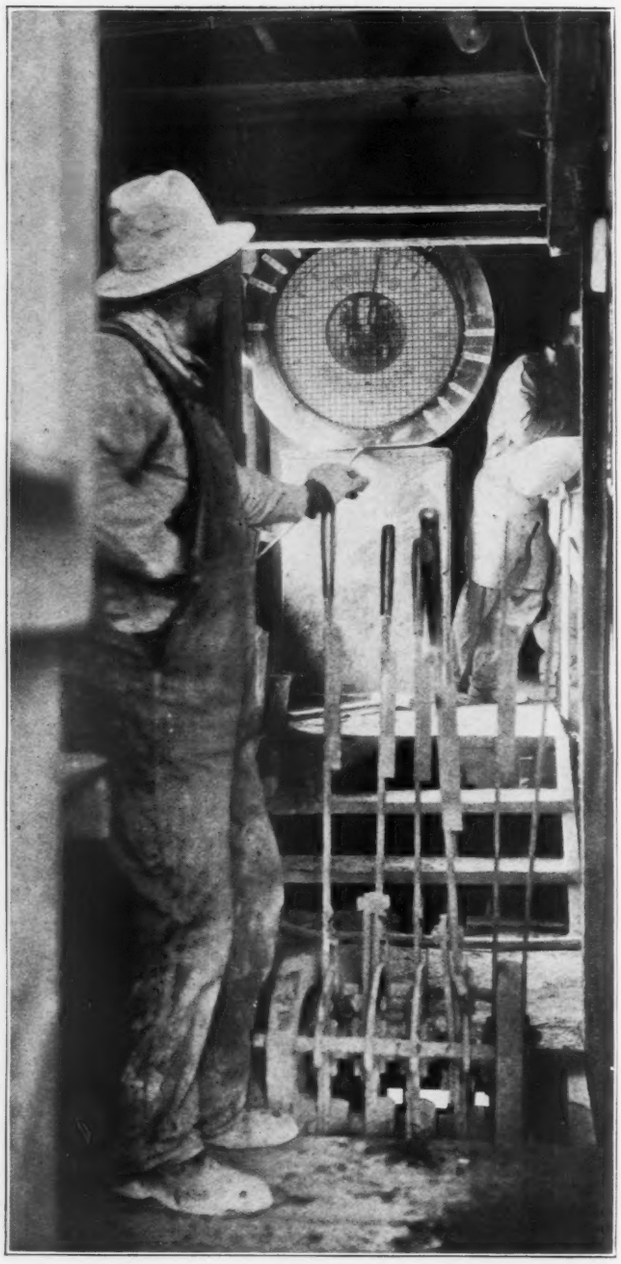
Where the storage bin is located at some distance from the point where the material is to be deposited, a steel frame may be extended to within a few inches of the ground or of the floor and provided with a platform upon which the operator may stand as the weigh larry moves back and forth. For such installations a motor-driven equipment is supplied so that a minimum time is lost from storage to point of deposit.

The duplex weighing agrabatcher, built by the

Blaw-Knox Batch Mixer at Plant of Sowerbutt Brothers



A Clyde Stiff-Leg Derrick, Handling Material at the Mixing Plant of the Columbia Sand Company, Washington, D. C.



Toledo Scales at the Plant of the Pioneer Sand and Gravel Company, Seattle, Washington

Heltzel Steel Form and Iron Company, is constructed in a rectangular shape, with two compartments. The capacity of the stone compartment is 3,000 pounds, while the capacity of the sand compartment is 2,000 pounds. It is suspended from a heavy channel frame, which is bolted to the bin proper. The gates between the bin and the batcher hopper are of the roller cut-off type, and are operated by a rack and pinion, and 20-in. diameter handwheel. The bottom gates are the drop type, and are controlled by individual levers, through a center toggle movement, which prevents the gates from opening until the operator is ready to discharge the batch.

A 5,000-pound American Kron automatic springless scale—manufactured specially for the Heltzel duplex agrabatcher—is used. The scale dial is three feet in diameter and is equipped with indicators which can be set to any desired position on the rim, so that the operator can disregard the scale graduations and obtain the required weight merely by centering the pointer of the scale on the proper indicator on the rim.

The Erie Steel Construction Company manufactures a combination volume weighing aggremeter which can be easily and quickly attached to almost any type of bin. The capacities of the boxes by volume are: sand 9 to 19¼ cubic feet, or stone 10.2 to 29 cubic feet. The scale capacity is 5,000 pounds. With this aggremeter, one operator is necessary and all operating members are directly in front, and in full view of him. He can see the material running into the boxes and at the same time see it flowing into the truck. Automatic draw-off doors can be worked separately or together, closing when the material is dumped. The entire plant is built of the best of material, and put together to give uninterrupted service.

Concrete has been subjected to numerous and varied scientific investigations, which have proved that the production of uniform concrete of predetermined strength is comparatively simple of attainment. Many prominent investigators claim that the ratio of water to cement is a controlling factor in the strength of the resulting concrete, when the concrete produced is plastic and workable. In laboratory work, the stone and sand are carefully dried and accurately measured. In laboratory mixtures, free water is used and as such it is easily measured.

A number of central ready mixing plants have installed Fuller-Kinyon conveying systems for transporting cement from both box cars and trucks to the storage and mixer bins. These systems are essentially similar to those used throughout the cement industry for conveying cement from mills to storage and from storage to packer bins, and in bulk to cars and barges.

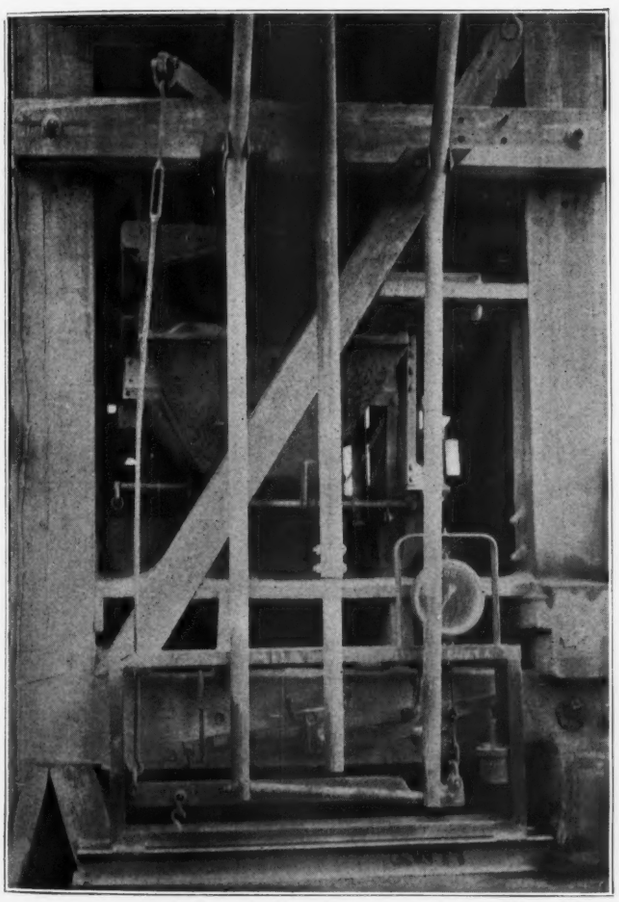
When used for bulk cement, the Fuller-Kinyon pump is usually located in a pit adjacent to the siding. The cement is either shovelled or delivered by a power scoop to the car door and discharged into a hopper above the pump, which delivers it through a pipe line to a storage silo, or directly to the mixer bins.

The pump is very similar to a pressure pump for transporting liquids, excepting that in this case the dry cement is advanced through the pump barrel by a rapidly rotating, differential pitch screw. Slightly beyond the last flight of the screw, compressed air is admitted through a number of small holes for the purpose of aerating the cement to make it flow as a liquid under the pressure applied to it. The pipe line is equipped with two or three-way valves, controlled either by hand or

automatically, to switch the flow to the desired bin.

Plants using bulk cement are of two general types. In the more common type, cement is conveyed to a storage silo located above the pump, or through a branch line directly to the mixer bins. By this arrangement, cement may be withdrawn from storage into the same pump, during the intervals when cars are not being unloaded, and sent to the mixer bins. In the other type of plant, all storage is provided in the bins above the mixers.

Three different sizes of systems are commonly used for handling bulk cement. For small plants, a system having a maximum capacity of 75 barrels per hour includes a 4-in. pump and 3-in. transport line. Plants requiring 150 barrels per hour use a 5-in. pump and 4-in. pipe line, and in the larger

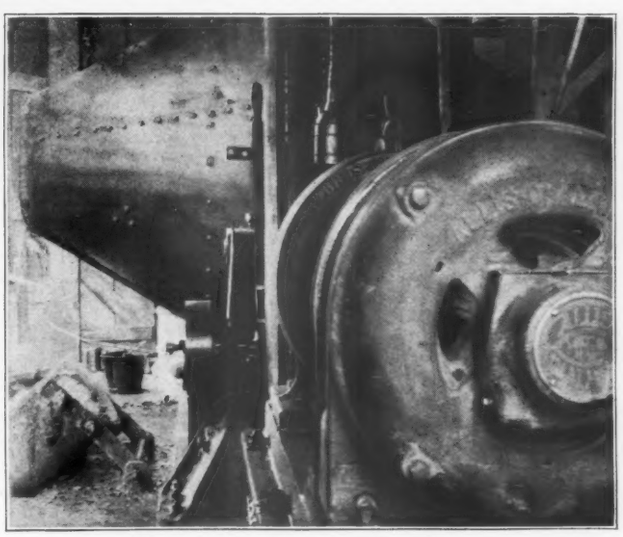


Standard Scale and Weighing Hopper

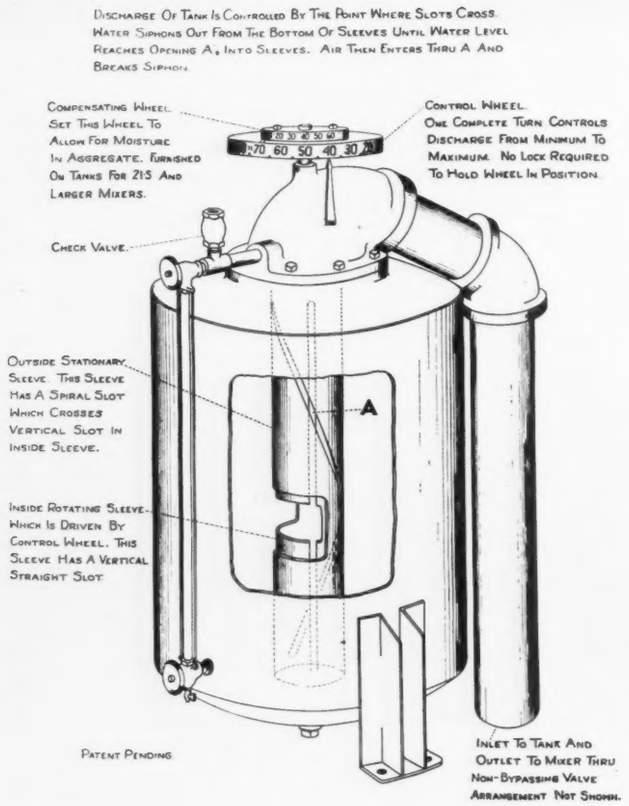
plants a 6-in. pump and 5-in. line will operate at a maximum of 225 barrels per hour. As the pipe line may be buried underground, cement cars may be unloaded without interference with other equipment and the unloading of sand and aggregate.

The Ransome Concrete Machinery Company makes a vertical supply tank because it believes it is easier to secure accurate measurements, due to equal vertical distances representing equal amounts of water, which may not be true in a horizontal tank. This means that any variation in cut-off affects the volume discharged from the horizontal tank more than it does from the vertical. After many months of study and experimenting, it has found that the siphon arrangement is much better than an adjustable overflow arrangement for discharging the tank. The siphon has the advantage of cutting off rapidly and sharply, whereas the effective head in the overflow is only the height of the water level in the tank above the overflow, which gets less and less and finally forms a swirl or vortex, due to the inability of the head to keep the discharge pipe filled. The final discharge in the overflow type is a slow dribble. Making the auxiliary siphon part of the main siphon, so to speak, gives a much more positive cut-off than

An Electrically Operated Barber-Greene Conveyor, Carrying Bulk Cement to the Koehring Mixer at the Plant of the Henry Horst Company, Rock Island, Illinois



Motor and Speed Reducer Drive for Smith Tilting Mixer


Discharge Of Tank Is Controlled By The Point Where Slots Cross. Water Siphons Out From The Bottom Of Sleeves Until Water Level Reaches Opening A, Into Sleeves. Air Then Enters Thru A And Breaks Siphon.
Compensating Wheel. Set This Wheel To Allow For Moisture In Aggregate. Furnished On Tanks For 21S And Larger Mixers.
Control Wheel. One Complete Turn Controls Discharge From Minimum To Maximum. No Lock Required To Hold Wheel In Position.
Check Valve.
Outside Stationary Sleeve. This Sleeve Has A Spiral Slot Which Crosses Vertical Slot In Inside Sleeve.
Inside Rotating Sleeve Which Is Driven By Control Wheel. This Sleeve Has A Vertical Straight Slot.
A
Patent Pending
Inlet To Tank And Outlet To Mixer Thru Non-Bypassing Valve Arrangement Not Shown.

Ransome Vertical Automatic Water Tank for Ready Mix Plants

when the auxiliary siphon is outside of the tank proper.

The discharge siphon is placed in the center of the tank in order to give minimum variation in discharge should the tank not be perfectly level. The spiral slot method is used to break the siphon action, rather than an outside auxiliary siphon, because the action is almost instantaneous, which is not true with the outside auxiliary siphon. Actual tests have shown that at any setting, the variation of the water level, after completion of the discharge, is so constant that a hook gauge shows no appreciable variation, provided all tests are made under the same conditions.

Outside of its absolute accuracy, the outstanding advantage of this tank, particularly as far as central mixing plants go, is that slightly less than one complete revolution of the handwheel at the top changes the quantity of water from a maximum to a minimum. In addition, the quantities are shown on the handwheel, so that adjustment for various quantities is instantly made. A compensating wheel on the top of the handwheel takes care of the amount of water in the aggregates, if desired. A gauge glass is provided, which makes visible to the operator the amount and speed of the discharge.

There is another important point which has been ignored, to a certain extent, and that is the most accurate water device, so far as the tank itself goes, is often a failure, due to the fact that the valve arrangement, which lets the water into the tank and from the tank into the mixer, permits by-passing, that is, when the water is being drawn from the tank into the mixer at the same time some water passes from the supply line into the mixer. Unless an absolutely non-by-passing valve is used, accurate measurement of water cannot possibly be obtained. The entire mechanism of the tank, so far as the siphon arrangement goes, can be removed by loosening the bolts that attach the head casting to the top of the tank, thus permitting an easy and quick adjustment.

The plant of the Concrete Supply Company of Winston-Salem, North Carolina is equipped with a 28-S Smith tilting mixer with batch hopper and water tank which are electrically driven. On the charging floor above the mixer, is a single acting hoist which is used in drawing batch cars up the incline, shown at the rear in the illustration. The batch cars are charged under existing bin and measuring batchers. This plant has been installed in an existing material yard and the arrangement has proven very satisfactory. You will note that trough type trucks with elevating bodies are being used. The use of a batch car has proved desirable in connection with existing plants of which the Winston-Salem installation is typical.

(To be continued)

Smith Tilting Mixer Concrete Supply Company, Winston-Salem, N. C.

Georgia's Newest Crushed Stone Plant Is Modern Operation in Every Detail

Plant of Fireproof Concrete and Steel Construction Handles All Materials By Belt Conveyors

By W. E. TRAUFFER

THE Consolidated Quarries Corporation of Atlanta, Georgia, recently put into operation a new crushed stone plant near that city which might well be called a model of its kind. No effort or expense was spared in its construction and only the most modern methods and types of equipment were used. Belt conveyors handle all of the material after it passes the primary crusher, eleven of them being used altogether.

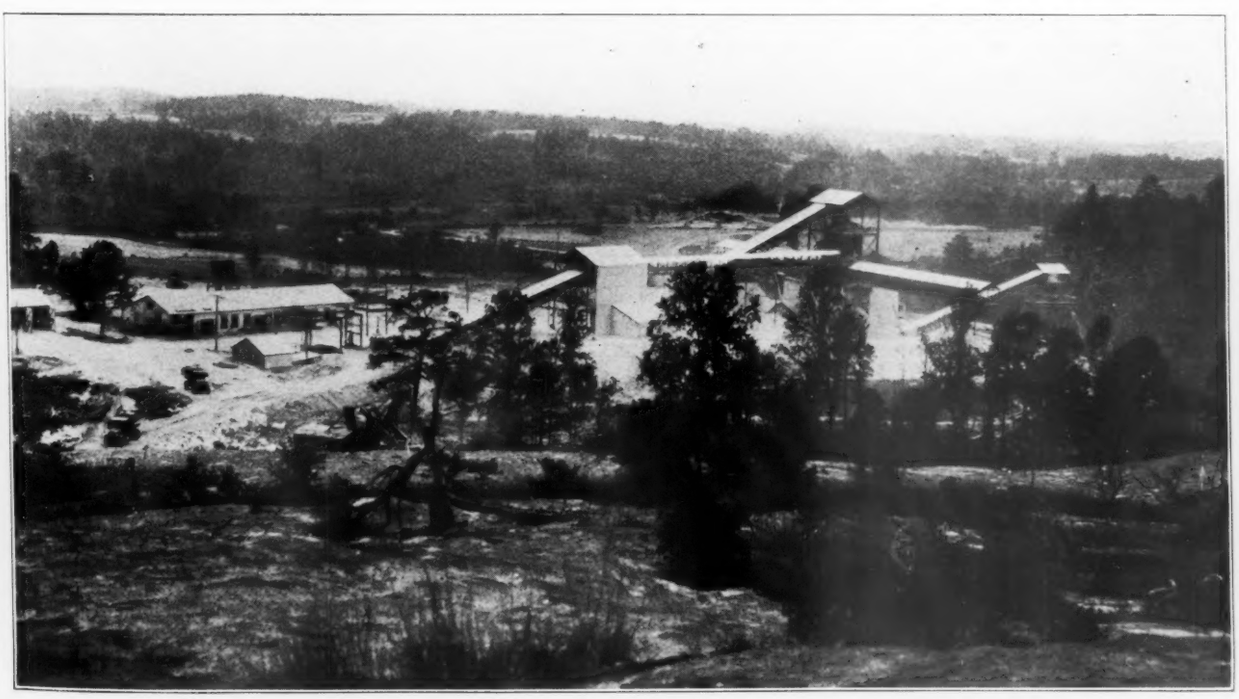
All foundations, pits, underground conveyor tunnels, and partition walls are of concrete. Each building has a structural steel framework and corrugated metal siding and roofing is used throughout the plant. The capacity of the plant is about 1,500 tons per 10-hour day. The corporation was organized in July, 1928, and the plant went into operation on April 1 of this year.

Part of Rock Chapel Mountain, Viewed from Plant. Abandoned Dimension Stone Quarry at Left

Location and Character of Deposit

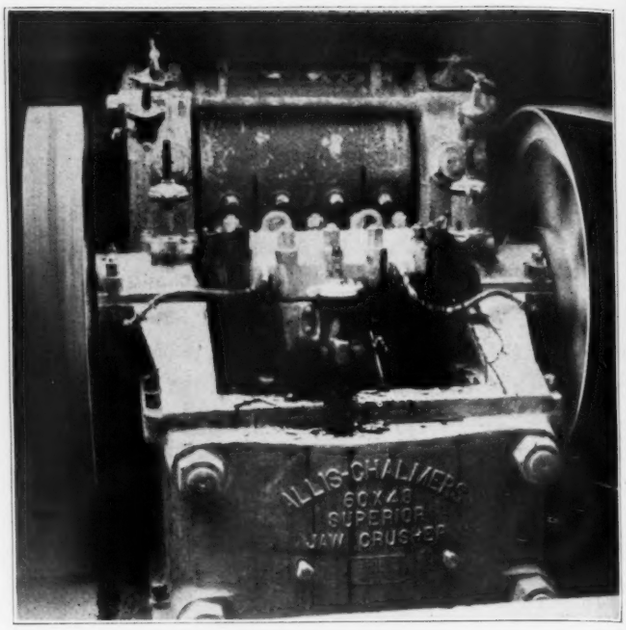
The plant is located on a 520-acre property near Lithonia, about 20 miles east of Atlanta. About 115 acres of this is a huge outcrop of granite known as Rock Chapel Mountain which, at its peak, is more than 150 feet higher than the surrounding country. It is estimated that there are about 15,000,000 tons of rock above the present quarry level, which is about 5 feet higher than the feed level of the primary crusher.

The granite of which this hill is composed is one of the oldest formations known to geologists and was probably created by the same upheaval of volcanic rock which formed its neighbor, the famous Stone Mountain. This mountain, ten miles to the



View of Plant From Top of Hill to the North. Power and Compressor House at Left

Shovel Loading Truck in Quarry



Primary Jaw Crusher

northwest, is plainly visible on a clear day. The stone in both of these localities is a light gray granite composed largely of feldspar with lesser quantities of mica and quartz. This stone has a crushing strength of 20,000 lb. per sq. in., a specific gravity of 2.63, and a high hardness value. In abrasion tests it has a French coefficient of 12.5 and, in toughness tests, 13 blows are required to fracture. The depth of the deposit is not known, but drilling to a depth of 200 feet near the edge of the mountain failed to penetrate it.

Quarry Operations

The quarry is just being opened into the mountain at the foot of the slope near the plant. The opening shot was really a bottom shot, although the surface had a slope of about 20 deg. About 300 tripod drill holes were charged with 3,000 pounds of Du Pont dynamite. The shot moved about 6,000 tons of stone and opened up about 200 feet of 20-ft. face. In spite of the massiveness of the stone and the lack of stratification, the shot was very successful, giving a level quarry floor and an almost perpendicular face. Eventually a straight face 800 feet long and 150 feet high will be operated. H. N. Hamilton, Du Pont explosives expert, supervised the loading and was present when the shot was made.

Drilling of the bank holes is being done with Ingersoll-Rand Type X-71 tripod air drills, using

Drilling in Newly Opened Consolidated Quarry—Note Arrrangement of Holes for Next Blast

Shovel Handling Stone in Quarry

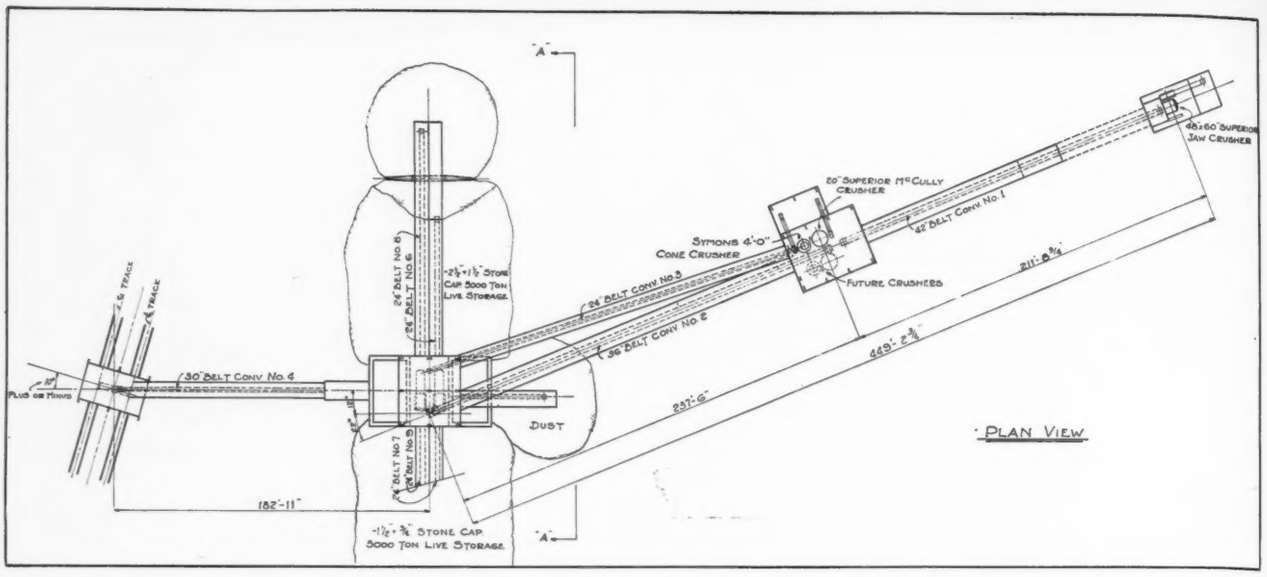
Part of Battery of Hum-mer Vibrating Screens

1½-in. steel 20 feet long. Ingersoll-Rand Type S-49 jackhammers are used for secondary drilling. Du Pont 60-per cent quarry gelatin is used for bank shots and 40-per cent for the secondary blasting. A Bucyrus 100 B electric shovel, using a 2½-cu. yd. dipper and mounted on caterpillars, loads the stone into trucks which haul to the primary crusher, at present about 300 feet away. These are Autocar 7½-ton trucks, with solid rubber tires, and are equipped with 6-cu. yd. capacity Easton Phoenix type side-dump bodies. They are dumped into the primary crusher hopper by a Curtis air lift supported from a structural steel framework. Another Curtis air lift is used to operate the stone hook for handling extremely large pieces of rock. A Cyclone 10-ton chain hoist is supported from the same famework and is used to handle the crusher parts.

Crushing Operations

The primary crusher is an Allis-Chalmers Superior 48-in. by 60-in. jaw crusher, belt-driven by a 200-hp. electric motor and equipped with a Cutler-Hammer controller. It discharges onto an inclined belt conveyor (No. 1) 42 in. wide and on 200-ft. centers, which discharges through a steel box and chute into the secondary crusher. A rail grizzly with 2½-in. spacing over the crusher box allows the fines to pass directly to the same belt conveyor onto which this crusher discharges. This

Air Hoist Dumping Truck Into Primary Crusher Hopper. Hook Operated By Cable From Air Cylinder at Left

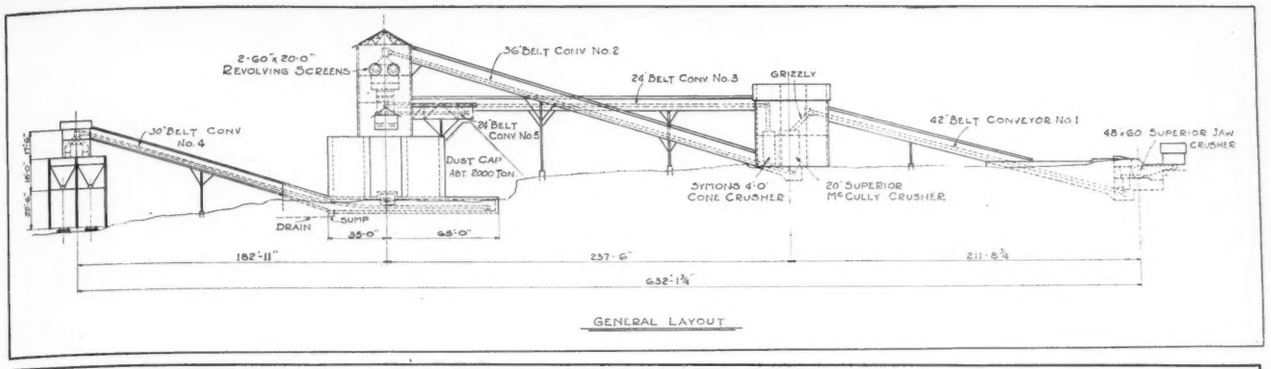


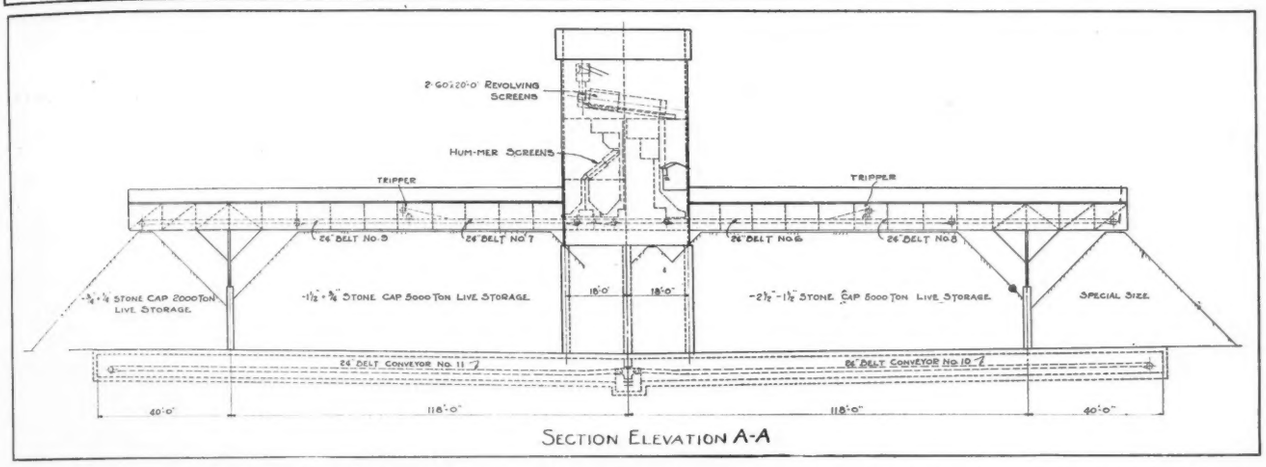
Plan View Showing Layout of Consolidated Plant

is an Allis-Chalmers Superior McCully 20-in. gyratory crusher, belt driven by a 125-hp. motor.

The secondary crusher discharges onto an inclined belt conveyor (No. 2) 36 in. wide and on 247-ft. centers, which conveys the rock to the top of the screening building. It there discharges through a steel split hopper into two 5-ft. by 20-ft. Allis-Chalmers revolving screens, each driven by a 25-hp. motor through a Jones worm-gear speed reducer. Both have 2½-in. and 1½-in. perforations and a ¾-in. dust jacket. The over-size discharges through chutes onto a 24-in. horizontal belt conveyor (No. 3) on 216-ft. centers, which carries it back to the secondary crusher building. This conveyor feeds a Symons 4-ft. cone crusher, which is belt driven by a 100-hp. motor. The belts which drive each of the three crushers were furnished by the Goodyear Tire and Rubber Company. This crusher discharges onto the same belt conveyor as the secondary crusher, the material returning through the same screens. These crushers also have Cutler-Hammer switches and controllers and

Ground Floor of Crusher Building, Secondary Gyratory Crusher (Right), Cone Crusher (Left)



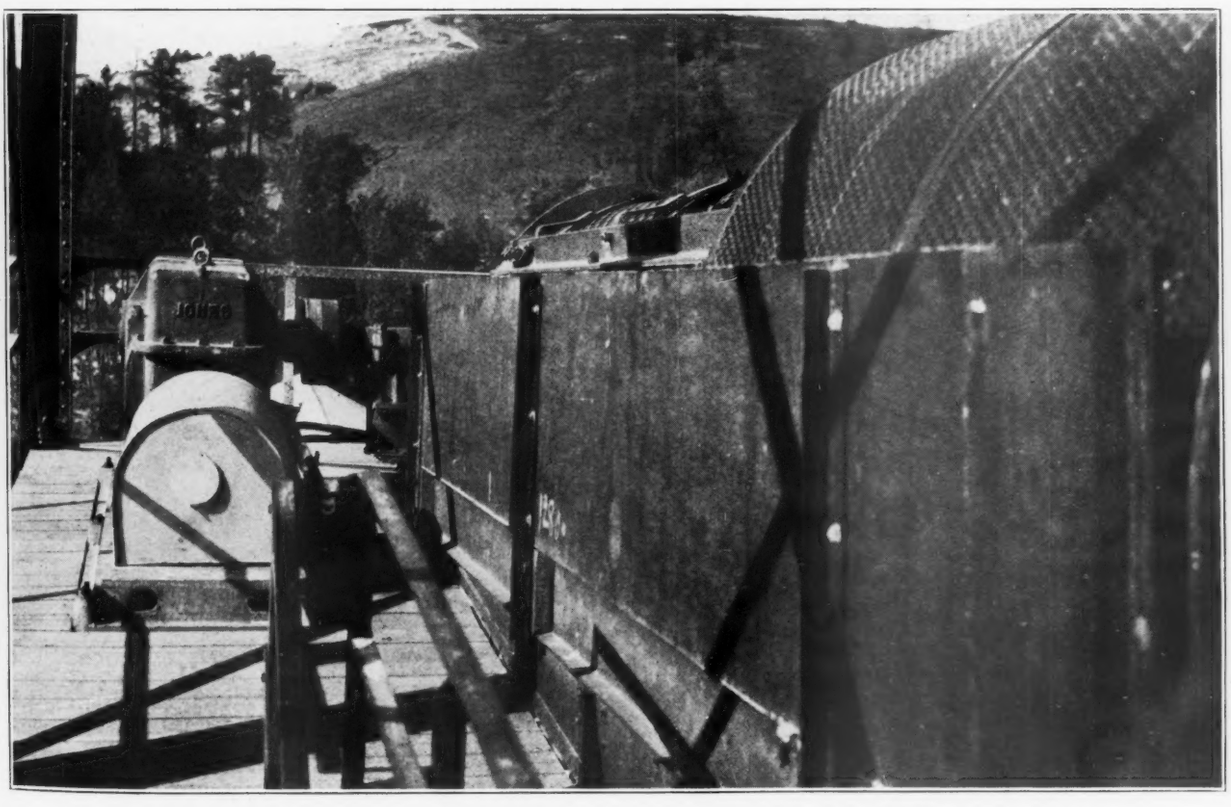


General Layout of Consolidated Plant Above. Section Elevation of Screening and Stockpiling Arrangement Below

another 10-ton Cyclone chain hoist for handling parts.

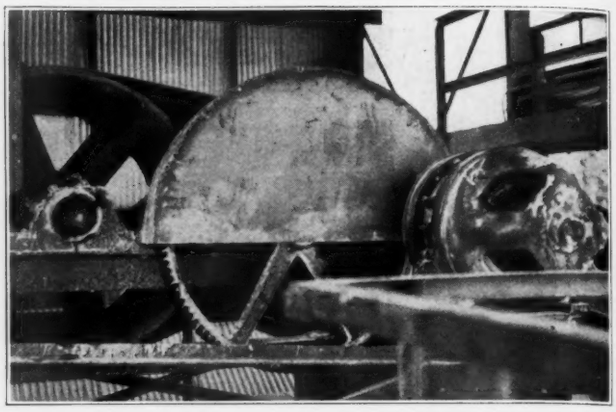
Screening and Storage

The 2½-in. to 1½-in. stone from the revolving screens either goes by a chute to a 5,000-ton capacity stockpile immediately north of the building or is fed onto a 24-in. horizontal belt conveyor (No. 6) on 84-ft. centers, which distributes the stone farther north on the same stockpile by means of a Stephens-Adamson tripper. The 1½-in. to ¾-in.



Speed-Reducer Drive of One of the Rotary Screens. Rock Chapel Mountain in Background

Tripper on One of the Stockpile Conveyors



Double Reduction Drive of One of the Inclined Conveyors

material is deposited in the same manner on a stockpile of the same capacity south of the building. This conveyor (No. 7) is 24 in. wide and has 92-ft. 6-in. centers.

The material passing the ¾-in. screens goes to two double-deck Hum-mer tandem vibrating screens, each consisting of two 4-ft. by 5-ft. units. The upper decks have ¼-in. and the lower decks 10-mesh woven wire screen cloth. The ¾-in. to ¼-in. and the ¼-in. to 10-mesh sizes discharge by chutes into two 1,000-ton capacity concrete storage bins. These bins, together with a concrete wall between them to separate the stockpiles previously mentioned, form the foundation on which the superstructure of the screening building rests. The screenings from the vibrating screens are carried by a 24-in. belt conveyor (No. 5) on 55-ft. centers to a 2,000-ton capacity stockpile east of the building.

A second stockpiling conveyor (No. 8) runs north from the screen house alongside conveyor No. 6 and in the same housing. This conveyor is 24 in. wide, operates on 154-ft. centers and discharges at its end onto a stockpile immediately beyond the north partition wall. This stockpile has a live storage capacity of approximately 2,000 tons and is used for special sizes of material. A similar conveyor (No. 9) on 129-ft. centers running south from the screening building is used for additional storage of ¾-in. to ¼-in. stone.

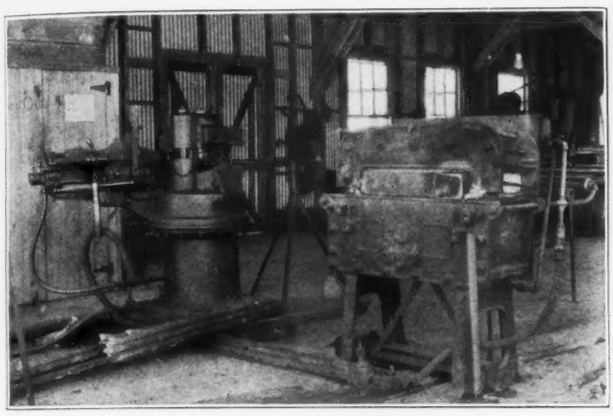
A 24-in. belt conveyor (No. 10) on 152-ft. centers, operating in a concrete tunnel extending north from the screening building, is used to recover the sizes stored by conveyors No. 6 and 8. The stone in the stockpiles forms its own hopper and discharges through openings in the top of the tunnel onto the belt, the rate of discharge being controlled by rack-and-pinion gates at each opening. A similar tunnel conveyor (No. 11) to the south stockpiles recovers the sizes stored by conveyors Nos. 7 and 9.

Both of these tunnel conveyors feed onto a third belt conveyor (No. 4) operating in a tunnel at right angles to them. This conveyor is 30 in. wide and operates on 248-ft. centers. It extends 65 ft. east from the point at which the other two con-

Plant From Southeast, Screening Building (Left), Secondary Crusher Building (Right)

veyors feed onto it, recovering the ¼-in. to 10-mesh from the concrete bin and the screenings from the stockpile upon which it was deposited by conveyor No. 5. It also recovers the ¾-in. to ¼-in. stone stored in the west concrete bin. This main recovering conveyor is horizontal under bins and stockpiles, but on emerging from its tunnel runs on an incline to the top of two steel car-loading bins into which it discharges.

One of the features of the plant is that, when the demand for material approximates the rate at which it is produced, very little handling is necessary. Two sizes of material can be chuted directly into the concrete bins and two more into the two stockpiles between the bins, making it necessary to operate only the short conveyor which stores the screenings. Also, in recovering the various sizes, it is seldom necessary to use any of the recovering conveyors to the loading bins. The total storage capacity of the plant is about 40,000 tons of graded sizes, while the live storage is about half that.



Drill Sharpener and Furnace in the Machine Shop

Each of the twin steel track loading bins has a capacity of about 100 tons. They discharge through gates and chutes which are controlled from the ground into cars on the double loading track beneath them. This track has a 2-per cent grade, allowing gravity feed, and has a storage capacity of 30 cars. By using both of these bins and loading them alternately with the conveyor, two different sizes of material can be loaded at one time, and it is a simple matter to load consecutive cars with any sizes of material desired, either in standard or mixed sizes, by feeding from several stockpiles at one time.

Another View of One of the Revolving Screens

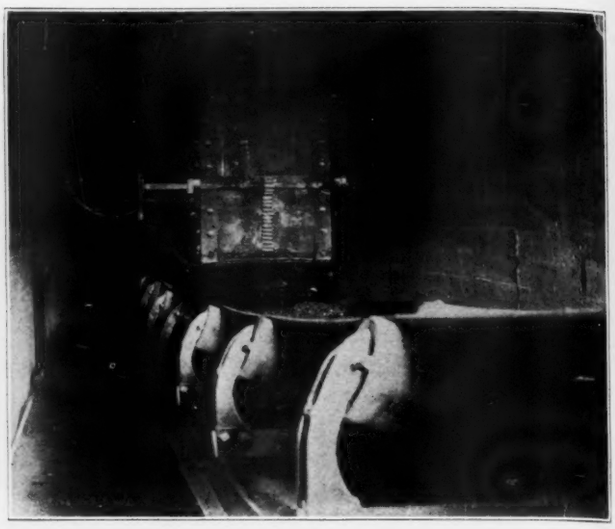
A 3-mile switch track to Lithonia connects with the main line of the Georgia railroad between Atlanta and Augusta. Most of the product is shipped within a radius of 150 miles and is used for concrete and macadam state highways and for streets and buildings in Atlanta and other nearby cities.

Power House and Machine Shop

A neat frame building, with concrete foundation and floors and corrugated metal siding, contains, in addition to the power switches, an air compressor room and a blacksmith and machine

Consolidated Plant from Southwest, Trestle for Switch Track at Left

The Two Steel Car-Loading Bins With Car Under One of Them for Loading

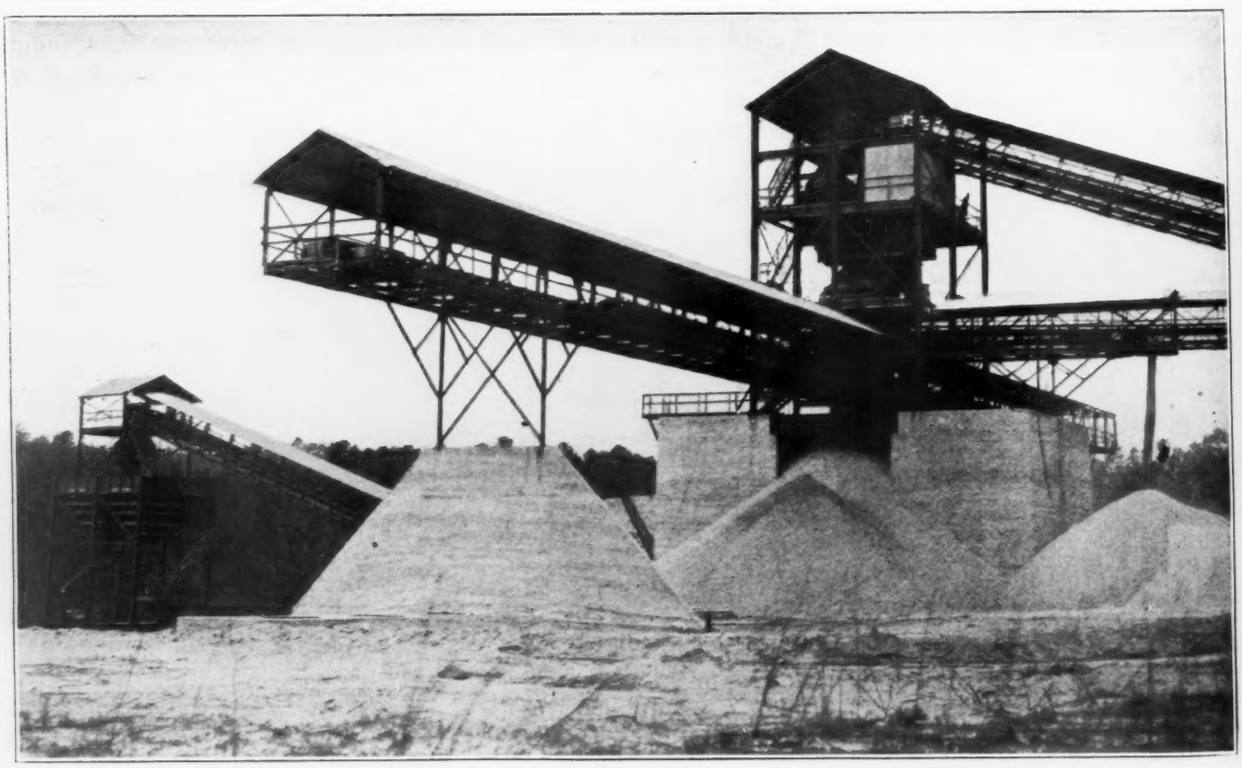


One of the Gates Feeding From Stock Piles onto Main Conveyor in Tunnel

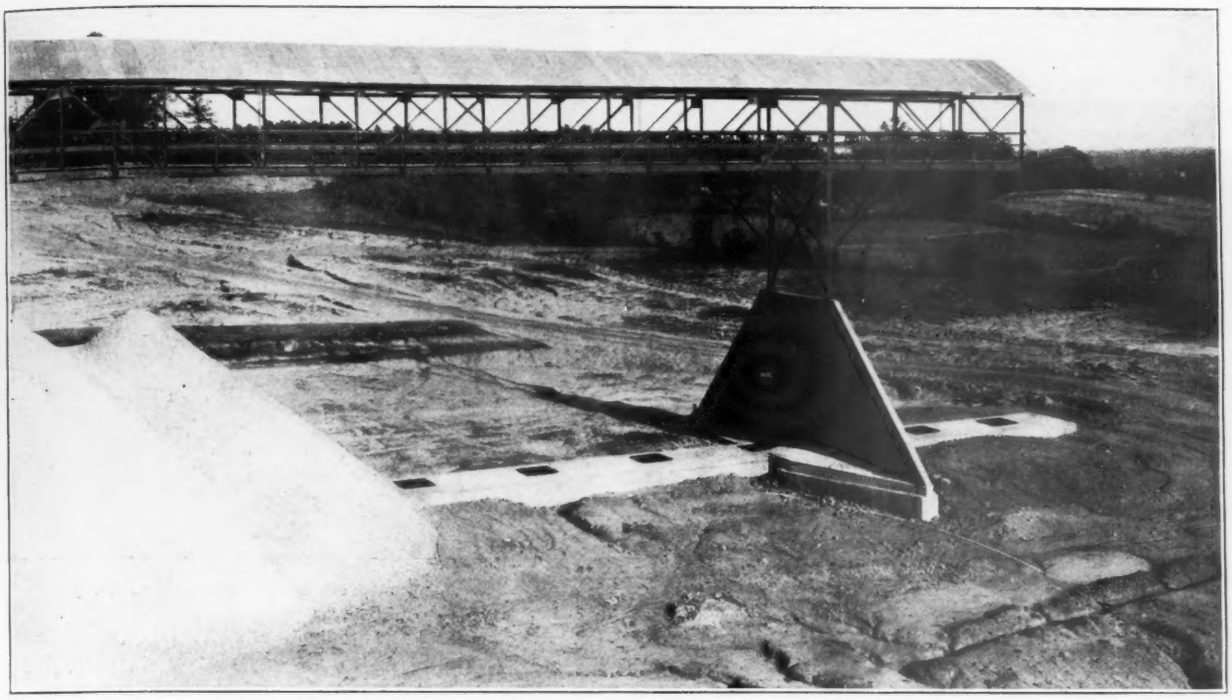
shop. The compressor is an Ingersoll-Rand class PRE 2 double compressor with 23-in. by 16-in. and 14-in. by 16-in. cylinders. It is driven by a direct-connected Allis-Chalmers 300-hp. synchronous motor and it uses an Allis-Chalmers 125-volt 7½-kw. direct-current generator, belt-driven from the compressor shaft, for excitation. This compressor furnishes air for the drills and air hoists.

The blacksmith and machine shops are completely equipped, containing, among other equipment, an Ingersoll-Rand Type 50 pneumatic drill sharpener with a furnace for heating the drills, a Steptoe shaper, a South Bend Lathe Works 24-in. swing, 12-ft. bed engine lathe, a Buffalo Forge Company 20-in. drill press and a Racine Tool and Machine Company automatic hacksaw, all of the latter driven from a countershaft by a 15-hp. motor. There is also a Cincinnati Electrical Tool Company emery wheel driven by a direct-connected motor and a complete set of blacksmith and other tools.

Electric power comes into the plant at 38,000



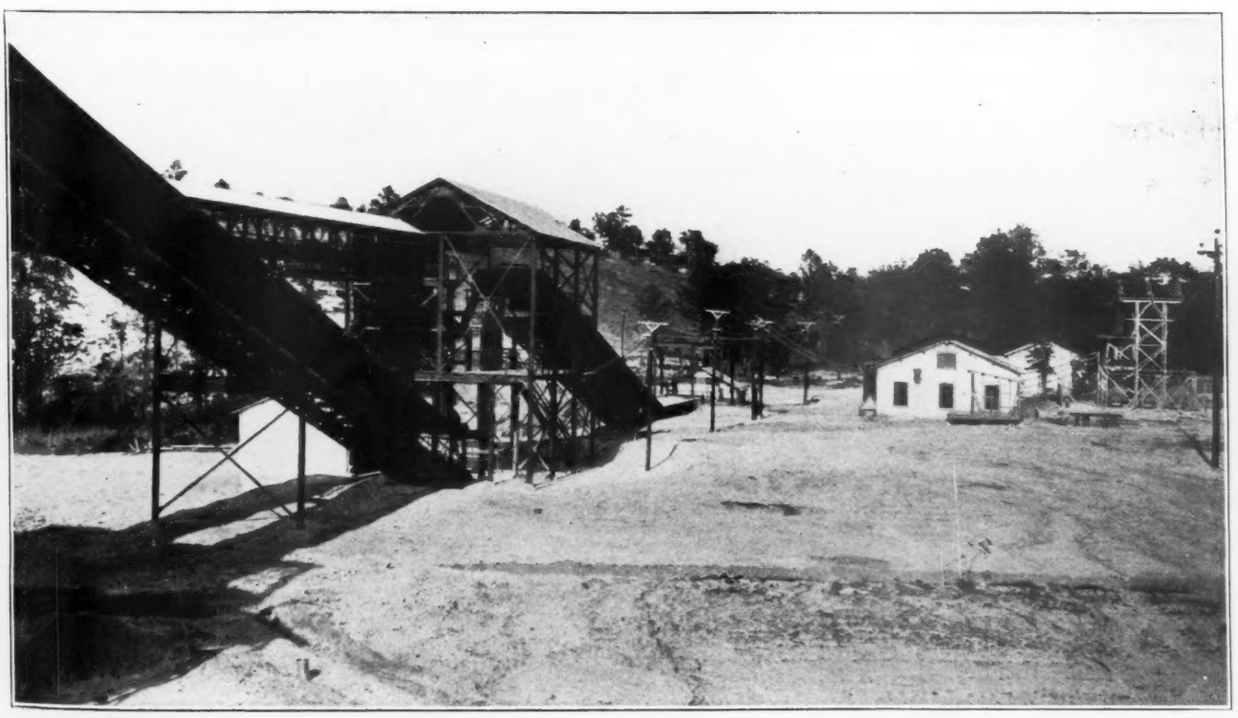
Screening Building, Stockpile Conveyors, Track Bins (Left). Note Top of Tunnel in Left Foreground



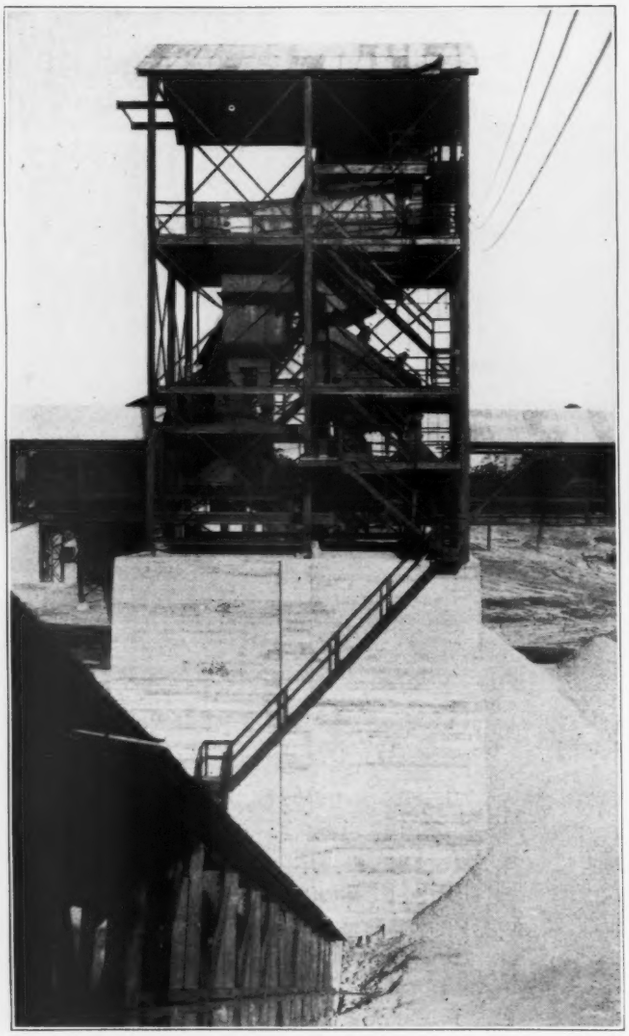
The South Stockpiling Conveyor Showing Concrete Partition Wall Separating Stockpiles and Tunnel Which Recovers From Stockpiles

volts from the lines of the Georgia Power Company and is reduced by three Allis-Chalmers transformers in an outdoor sub-station to 575 volts for general plant use. A five-panel switchboard in the power house controls all plant operations. All of the electrical equipment, including the motors, was furnished by the Allis-Chalmers Manufacturing Company. Crouse-Hinds Conduit is used for all electric wiring.

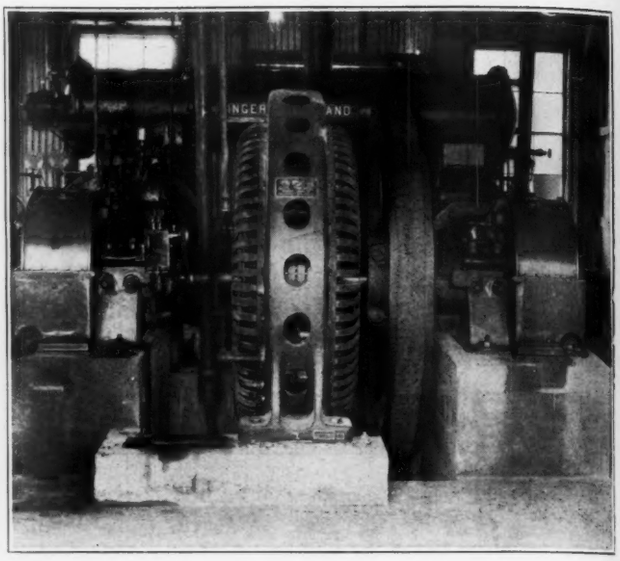
Water for cooling the compressor and the primary jaw crusher is pumped from a small lake formed by damming up a creek which runs near the plant. A small Allis-Chalmers centrifugal pump, electrically driven, pumps the water at the rate of 100 gpm. to a storage tank near the machine shop, from which it is piped to the various parts of the plant. Drinking water at present comes from a nearby spring, but a 600-ft. well with a Cook plunger-type pump will soon be completed.



Inclined Conveor to Secondary Crusher House (Center), Machine Shop (Right), Screen House (Left)



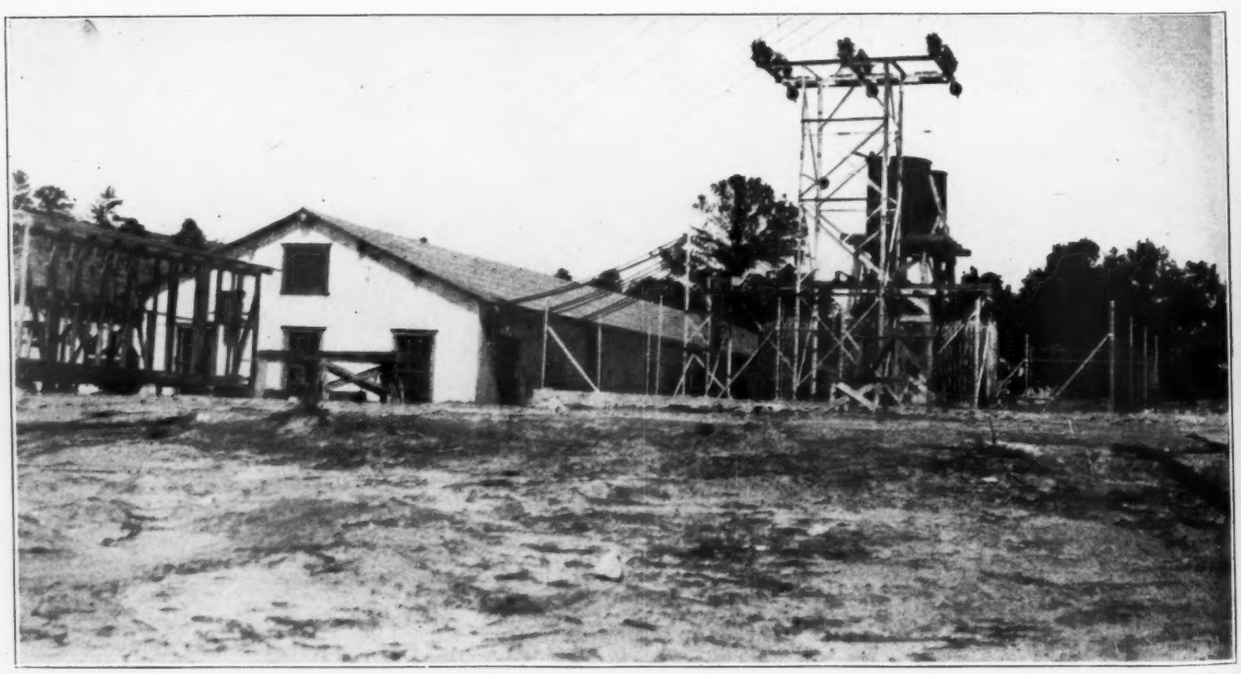
Screening Building, Showing Arrangement of Screens, as Viewed From Hoppers



The Air Compressor in the Machine Shop

Miscellaneous Information

The plant was erected by the McDonald Construction Company, which did all of the concrete work, installed the machinery and graded the railroad switch track. The structural steel framework, steel chutes and boxes, tunnel gates and steel loading bins were furnished by the Virginia Bridge and Iron Company. The belt conveyors and the two automatic trippers were furnished by the Stephens-Adamson Manufacturing Company, the three inclined conveyors being equipped with Stephens-Adamson silent safety pawls to prevent reversing, should the power fail while the belts are loaded. All conveyor belting is the New York Belting and Packing Company's Indestructible brand and all of the rubber hose used for air and



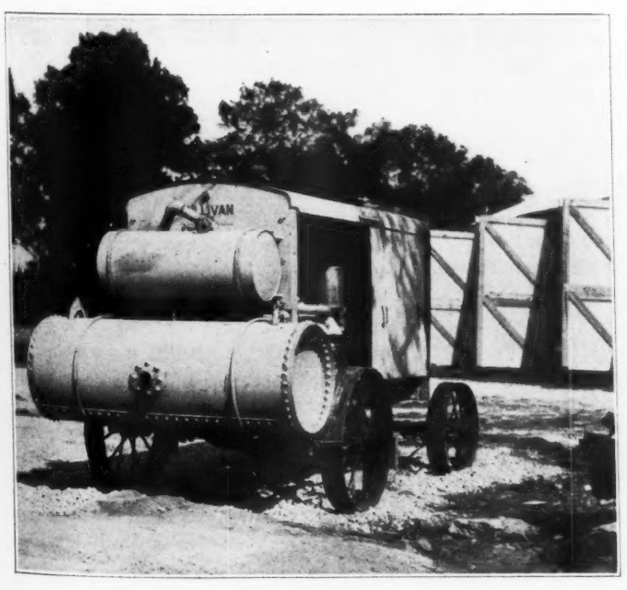
Machine Shop and Outdoor Sub-station. New Oil House Under Construction at Left

Superintendent Nelson Severinghaus

water lines was furnished by the Electric Hose and Rubber Company. Jenkins pipe fittings are used for both air and water lines and the steel stairways, which are used exclusively throughout the entire plant, are Vizabledg Safster type, made by the Irving Iron Works.

Nelson Severinghaus, superintendent of the plant, is a graduate mining engineer and, before this plant was built, had been superintendent of the Chestatee plant of the Piedmont Corporation for more than three years. He maintains his office in a neat frame building near the plant, which also contains a drafting room and a storehouse for tools and spare parts.

The main office of the company is in the Bona Allen Building, Atlanta. The officers are A. F. Hyde, president; R. H. Cobb, vice-president; A. G. Loomis, secretary and treasurer; and G. A. Austin, general manager.



Portable Air Compressor

Public Interest Is Drawn To Cement Industry

The request made by American cement manufacturers for tariff protection on Portland cement, backed by an appeal to the Ways and Means Committee of the House of Representatives by 25,000 building material dealers, has attracted considerable attention in financial circles to the position of this industry.

Cement labor in this country, the manufacturers note in their petition, is paid an average of 56 cents an hour as against 13 cents an hour in Belgium, the chief competitor, representing a direct labor cost of about 9 cents a barrel for Belgian cement against 30 cents a barrel for the American industry.

Pending the decision on the tariff, the industry has been favored by the approval by President Hoover of a proposal to create a huge revolving fund to combat unemployment, in times of business depression, by speeding up the construction of public works. The proposed construction of Boulder Dam and Mississippi flood reliefs are outstanding projects of this nature.

Kansas Could Supply Nation's Salt Demands

Enough salt to supply this country for 500,000 years lies in Kansas salt mines, believes Kenneth K. Landes, assistant state geologist and professor of geology at the University of Kansas. His surveys have disclosed the existence of nearly 5,000,000,000,000 tons of salt. Deposits 300 feet thick are found in two counties. He suggests that, in ancient times, an arm of the Gulf of Mexico extended into what is now western Kansas and Nebraska. Sand deposits or upheavals of the earth's crust to the southward, he believes, cut off part of this sea, leaving the salt by evaporation.

New Corporations

Dover Sand Co., Oklahoma City, Okla. $20,000. B. Madole, H. C. Worley, Geo. H. Cope.

B. & B. Sand & Gravel Co., Moosic, Pa. $5,200. I. H. Rosner, Treas., 632 N. Main St., Wilkes-Barre, Pa.

Home Insulation Co., G. B. J. Gerety, White Plains, N. Y. $100,000. To mine asbestos.

Rogers County Stone & Lime Co., Claremore, Okla. $100,000. E. R. Jones, Muskogee; W. T. Bowling and W. T. Long, Claremore.

Big Harpeth Quarries, Inc., Kingston Springs, Tenn. $100,000. Ralph E. McClean, Pres.; Morris E. McClean, Geo. G. Keith, Herbert Fox, J. G. Stephenson.

Florida Basic Rock Co., Marianna, Fla. $65,000. W. S. Brandon, Pres.; D. P. Daniel and W. A. Quagge, V. P.; Carl A. Robinson, Sec.-Treas.

Wehde Gravel Co., Old Monroe, Mo. $3,500. To produce sand and gravel, crushed rock, and ballast. Bd. of Dr.: Henry Wehde, Sr., Chair.; Henry Wehde, Jr., H. Hemmersmeyer, Henry Holtzman, W. H. Dyer, Chas. R. Clemmonds, Jas. J. Connaughton, John F. Whalen, Tony Hendricks, H. Jackson, all of Old Monroe, Mo.

Roslyn Tile Co., Hempstead, N. Y. $200,000. To produce sand and gravel.

Jex Service Co., Capt. Ralph W. Jex, 1735 Summit St., Toledo, O. $200,000. To pump sand and gravel from Lake Erie.

Atlas Sand & Gravel Co., Houston, Tex. $30,000. J. E. Boyd, R. A. Griffin, W. P. Callaway.

R. H. and W. E. Bowly, Port Jervis, N. Y. 100 shares com.

Cooley Gravel Co., 220 N. Illinois St., Indianapolis, Ind. 200 shares n.p.v. $5,000 to be used in Missouri. Bought Sampsel, Mo., gravel pit of Johnson & Hudson. C. G. Cooley in charge, 716 Clay St., Chillicothe, Mo.

Brick & Fdry. Sand Co., 18304 Lanser St., Detroit, Mich. $3,000.

Boone County Quarry Co., Kansas City, Mo. 200 shares com. n.p.v.; 100 shares pfd. $100 each. J. A. Moore, G. B. Moore, both Columbia, Mo.; G. G. Moore, Kansas City, Mo.

Martin Marble Co., Batesville, Ark. J. A. Martin, Battery Park Hotel, Asheville, N. C. Will develop marble deposits at Batesville.

Paragon Kaolin Co., Langley, S. C. $100,000.

Port Stockton Cement Co., Carson City, Nev. To develop limestone quarry at Columbia, Calif., and build cement plant at Stockton, Calif. W. C. Stevens, A. E. Roberts, Louis Everett, F. B. Hyder, Robert Lee Dunne.

Hanover Sand & Gravel Co., % Edw. L. Forbes, 157 New St., Belleville, N. J. 2,500 shares n. p. v.

Universal Silicate Stucco & Lime Products Corp., San Francisco, Calif. 50,000 shares pfd., $100 each; 500,000 shares n.p.v. Merger of Abramson-Bode Corp., Lindsay, Calif.; and Universal Silicate Stucco Co., Los Angeles, Calif. J. J. Abramson, Frank H. Bode, Ralph Hansen, Herman A. Bachrack. To develop limestone deposits.

Snowhite Limestone Co., Pueblo, Colo. 50,000 shares n.p.v. Affiliated with Pueblo Lime Co. Incorporators: Jay D. Thomas, Mgr., Pueblo Lime Co.; E. E. Thomas, Garfield, Colo. Will develop limestone quarry at Garfield. New lime kiln will be constructed at plant of Pueblo Lime Co.

Dickason Sand & Gravel Co., Cayuga, Ind. $50,000. Brownell Improvement Co., Builders Bldg., Chicago, has leased sand and gravel deposits at Cayuga and formed above company.

Eastern Rock Products, Inc., 404 Court St., Utica, N. Y. 3,000,000 shares pfd., $100 each; 15,000 shares com., n.p.v. Merger of Boonville Sand Corp., Peerless Quarries, Inc., and Broome County Sand & Gravel Corp., all of Utica. Plants to be operated are located at Boonville, Forestport, Sterling Creek (no P.O.), Herkimer, Oriskany Falls, Solsville, and Chenango Bridge, N. Y. Harold V. Owens, Pres. & Treas.; Henry R. Beebe, V. P.; Albert S. Owens, V. P. & Mgr. of Sales; George F. Ferris, Sec.

Sea Isle Junction Sand Co., Frank S. McKee, Bridgeton, N. J. 2,500 shares com.

Bagot Sand Co., Ltd., Montreal, Que., Can. $11,000.

Duck Creek Stone Co., Howard, Albertville P. O., Wis. 250 shares, $100 each. H. Beemster, W. Sheedy, C. G. Chadek.

Centropolis Crusher Co., Kansas City, Mo. $50,000. Wm. A. Ross., Robert P. Lyons, Artileus V. Eulich, directors.

Dufferin Paving & Crushed Stone, Ltd., Hagersville, Ont., Can. 102,000 shares.

Oneida Pink Granite Co., Fred P. Wagner, Supt., 515 First Nat. Bank Bldg., Utica, N. Y. $350,000. Directors: Geo. R. Anthony, Benj. T. Gilbert, Utica; Prof. Nelson C. Dale, Hamilton College, Clinton, N. Y.

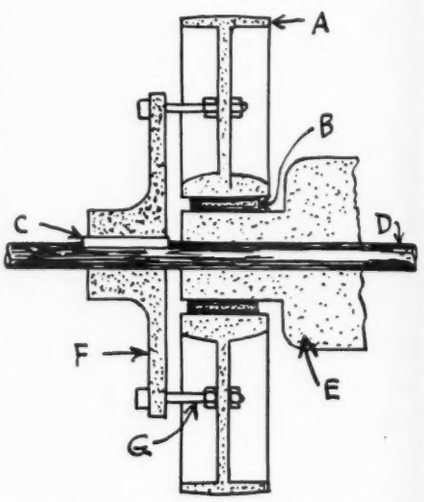
Portland Trap Rock Co., Inc., Portland, Me. $10,000. Fred C. Phelan, Pres., South Portland; Giuseppe Casale, Treas., Portland; Lawrence B. Anderson, Portland.

Scheme Is Proposed to Eliminate Shaft Deflection

By W. F. Schaphorst, M. E.

An excellent way in which every bit of belt-pull can be eliminated from shaft bearings is shown in the sketch herewith. Shaft deflection due to belt-pull is therefore eliminated also. This method requires less space, and instead of two additional bearings as are sometimes used, there is only one —a roller bearing which consumes less power than ordinary plain bearings.

The sketch shows how, by turning down the housing E of the motor if possible, or by casting such a housing and attaching to the motor and then mounting the pulley on this housing, and equipping with roller bearings B between the pulley and hub, all the belt-pull falls directly upon the shaft housing. The flexible coupling F shown at the left is keyed onto the shaft C and is connected to the pulley A by means of bolts G or by other methods familiar to all who use flexible couplings.



Scheme for Eliminating Belt Pull on Shaft Bearings

By applying this method there can be no binding or deflection in the shaft, and friction is reduced to the minimum. No more space is used here than when the pulley is placed as it often is, on the end of the shaft, thereby giving the undesired overhang. With this method, the force on the shaft is purely a twisting or torsional action—an ideal condition. The only bending is that caused by the weight of the shaft itself plus whatever the shaft supports.

If desired, ball bearings may be used in place of the roller bearings shown. Or, if roller or ball bearings are considered too expensive, simply use a plain bearing instead of the anti-friction type.

INTIMATE NEWS OF MEN AND PLANTS

Seven Utica Plants Merged Under One Control

Seven plants that produce sand, gravel, and crushed limestone in the vicinity of Utica, New York, were merged recently into the Eastern Rock Products Company. The consolidation involved the Boonville Sand Corporation, the Peerless Quarries, Inc., and the Broome County Sand and Gravel Corporation.

The officers of the new corporation are: Harold V. Owens, president and treasurer; Henry R. Beebe, vice-president; Albert S. Owens, vice-president and manager of sales; George F. Ferris, secretary. The directors are T. Harvey Ferris, Henry R. Beebe, Albert S. Owens, Harold V. Owens and George F. Ferris.

The plants, formerly operated by the three merging companies and which will be operated under the new management, are as follows:

Plant No. 1—Boonville. Capacity 2,000 tons per day of all grades of screened sand.

Plant No. 2—Forestport. Capacity 800 tons per day of washed and graded sand.

Plant No. 3—Sterling Creek, six miles east of Utica. Capacity 2,500 tons per day of washed sand, washed and screened gravel and crushed gravel.

Plant No. 4—Herkimer. Capacity 300 tons per day of washed sand and gravel.

Plant No. 5—Oriskany Falls. Capacity 1,800 tons per day of crushed and washed limestone.

Plant No. 6—Solsville. Capacity 400 tons per day of washed and graded sand.

Plant No. 7—Chenango Bridge. Capacity 800 tons per day of washed sand and gravel.

The corporation is also joint owner with J. F. Paddelford of the Chenango Valley Sand and Gravel Company, Inc., which owns and operates plants at Sherburne and Whitney Point with daily capacities of 1,000 tons and 800 tons respectively, of washed sand and gravel.

Fred T. Evans has been appointed engineer for the Portland Cement Association with headquarters in Seattle, Washington.

Ben E. Teschner has been made representative of the Monolith Portland Cement Company for the district covering Oregon, Washington, and Idaho east to Boise.

Half-Million Dollar Expansion By Canadian Company

A mining development of great importance to the Province of Nova Scotia is involved in the extension work undertaken by the Atlantic Gypsum Company, Ltd., whose principal operations are at Cheticamp. These developments will involve well over half a million dollars in money and will include the erection of a large modern mill where the raw products will be crushed and prepared for sale and also the construction of a new shipping pier. These extensions have followed as a result of the taking over by the Atlantic Gypsum Company of the operations and equipment of the Ingonish Gypsum Company and the Canada Cement Company. This enlargement of the present industry, it is announced, will give employment to over 300 men.

As a result of the reorganization, the Atlantic Gypsum Company will provide the gypsum requirements of the Canada Cement Company, Limited. Officials of the Atlantic Gypsum Company, Limited, estimate that during the coming summer the production of the mines of the company will be 300,000 tons of gypsum. This will represent a very substantial increase in production.

Inland Lime Company To Build Docks

Inland Lime and Stone Company, at Manistique, Michigan, has awarded a contract to Merritt, Chapman and Scott Corporation, of New York, for the construction of docks and a breakwater near Suel Choix Point, which district will be the center of activity of the giant quarry project launched by the Inland company.

Feldspar Plant in North Carolina Begins Operation

Latest of the large mineral developments in North Carolina to begin operations is the plant of the Feldspar Milling Company, near Bowditch. Three carloads of materials, the first output of the mill, were shipped from the plant recently.

A first class chemical laboratory is completed. Analyses of the first shipment showed not more than 67 per cent silica, 19 to 20 per cent alumina, from 11 to 14 per cent combined alkali and less than 0.05 per cent iron-oxide.

The supply of spar for the mill comes chiefly from the company's mines, all of which are located within two miles of the plant. The mill has a capacity of 110 tons daily. With orders already on hand for several months' grinding, it is believed that the outlook for this firm is promising.

Cement Company Re-elects Its Officers

Officers re-elected at the annual meeting of the Newaygo Portland Cement Company of Grand Rapids, Michigan are: President, Clay H. Hollister, vice-president and general manager, J. B. John; vice-president, L. E. Geer; secretary, C. E. Wyman; treasurer and assistant general manager; William A. Ansorge. Directors include Clay H. Hollister, J. B. John, L. E. Geer, William A. Ansorge, Mrs. Daniel McCool, H. D. Higinbotham, Fred Vogel, Jr., P. H. Travis and C. C. West.

Idaho-Portland Cement Company Elects Officers

The annual meeting of the stockholders of the Idaho-Portland Cement Company, which is now completing a plant at Inkom, Idaho, was held recently in Pocatello. The following officers were elected. E. J. Simons, president; J. B. Maxfield, first vice-president; J. H. Neill, second vice-president and consulting engineer; J. Tom O'Brien, treasurer; A. J. Lindsay, secretary.

These men with Eugene Enloe and N. J. Dolph of Spokane comprise the board of directors of the company. Mr. Neill is also treasurer and general superintendent of the International Portland Cement company of Spokane, Washington.

New Castle Quarry To Open On June 1

The modernly equipped stone quarry of the New Castle Lime and Stone Company at Connellsville, Pennsylvania, will be ready for operation by June 1. Inclement weather has caused a postponement of beginning operations from May 1. The quarry, which will give employment to 100 men, will be one of the best equipped in western Pennsylvania.

The quarries and business of the Toronto Limestone Company have been acquired by the Canada Gypsum and Alabaster Company of Paris, Ontario. William Goudy remains as manager and proposes to double the production.

Industrial Silica Corporation Is a Merger of Fourteen Companies

A merger of significance among non-metallic operators and one that has been the basis of much premature newspaper publicity has just been completed, or at least has reached a state that permits its promoters to announce details.

This involves sixteen companies that produce silica sand in Pennsylvania and Ohio, as follows:

Coxey Silica Company, Massillon, O., with plant at Dundee, O.; Everhard Company, Massillon, O.; Venango Sand Company, Franklin, Pa.; Oliver Silica Sand Company, Massillon, O., with plants at Killbuck and Warwick, O.; Portage Silica Company, Youngstown, O., with plant at Phalanx, Garrettsville P. O., O.; Dick-Sand Company, Franklin, Pa., with plant at Polk, Pa.; Franklin Industrial Company, Massillon, O., with plant at Warwick, O.; Corwin Albright Company, Massillon, O.; Massillon Sand and Stone Company, Massillon, O., with plant at Barr, Barrs Mills P. O., O.; Newman Silica Sand Company, Massillon, O., with plant at Newman, Massillon P. O., O.; Ayers Mineral Company, Zanesville, O.; Beach City Silica Sand Company, Beach City, O.; Geauga Silica Sand Company, Cleveland, O., with plant at Geauga Lake, O.; Leesburg Silica Sand Company, Newcastle, Pa.

All transactions have been completed for eleven of these fourteen companies, and papers on the remaining companies will be completed soon. It is probable that two additional companies will enter the merger.

The capitalization is placed at $2,500,000, with securities as follows: $1,000,000 in 6-per cent first mortgage bonds, $1,500,000 in 6½-per cent preferred stock at $100, and 150,000 shares common stock of no par value.

All of the financial negotiations, including the details of organization, were handled by the Chicago brokerage firm of Cochrane, Scott and Company. Ford, Bacon and Davis, prominent engineers with main office in New York, acted in appraisal and consulting capacities throughout the deals.

The officers of this merger, which is titled the Industrial Silica Corporation, are as follows: E. E. Klooz (formerly president of Portage Silica) Youngstown, president; R. J. Raney, of Cochrane, Scott and Company, chairman of board; Jacob S. Coxey, Jr., Massillon, vice-president; Lee Farrell, Youngstown, secretary-treasurer; and following as additional directors: Andrew M. Scott, of Cochrane, Scott and Company, Chicago; Chess Lamberton, Franklin, Pa.; E. M. Ayers, Zanesville, O.; C. E. Manchester, Youngstown, O.; Henry Butler, Youngstown.

The head office will be in Youngstown, with branches at Franklin and Massillon. Plans call for shutting down eight of the plants and centering operations in six only. The company's estimated capacity will be between 500,000 and 600,000 tons annually. A research department is to be organized in efforts to produce the highest quality of silica sand ever marketed on a large scale. A metallurgist will devote his efforts to the development of high-grade sand suitable for all steel and foundry purposes.

Studies and alterations will be made to bring each operating plant up to its highest possible efficiency.

Federal Court Appoints Eugene Holland Receiver

A receivership proceeding of the Universal Gypsum and Lime Company has been instituted in Federal Court. Abel Davis of the Chicago Title and Trust Company and Eugene Holland, president of the company, has been appointed a receiver and an order has been entered by the court authorizing a continuation of the business.

This receivership will in no way affect the operation of the company so far as the customers are concerned. The plants will continue to operate, producing the same high class Universal products as before. The administration of the company will remain under the same management, which is assurance that the present policies of the Universal Company which have been so acceptable from the dealer's standpoint will be continued. Credit relations will in no way be disturbed and commitments and sack liabilities will be handled in the usual manner. Officials of the company hope that operating under a receivership will be of short duration and that closely following a refinancing and reorganization will be effected which will place Universal in a strong position.

Seattle Gravel Company To Enlarge Its Production

Following a recent increase in capitalization from $2,000,000 to $3,000,000, the Pioneer Sand and Gravel Company of Seattle, Washington, announced its plans for the immediate expansion of its plant and operations. Approximately $400,000 is to be spent in this policy.

The expenditure program provides $150,000 for expansion of the company's plant at the south end of Lake Union, $125,000 for its plant at the North End, $100,000 for new bunkers at 14th Avenue Northwest and the Lake Washington Canal, and a new bunker at the foot of First Avenue Northeast.

Upon completion of the projects, the company will have five central cement and concrete mixing plants instead of three now in operation. The two new mixing plants will be at the north and south Lake Union holdings.

Tremendous increase in the demand for the company's products and the new mode of mixing cement for construction purposes at a central plant instead of on the job after delivery of the ingredients account for the expansions.

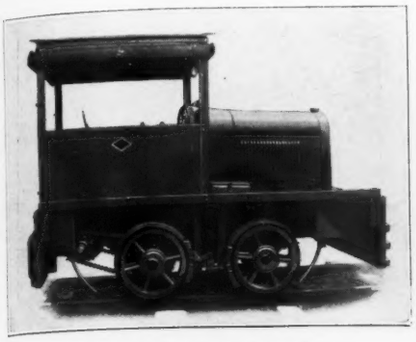
National Portland Contemplates Extensions

The National Portland Cement Company of Houston, Texas, is completing a 250-barrel white cement plant and contemplates extensive additions. Russell Ellis of Dallas, financial advisor to the company, has been in Temple recently to secure the services of representative business men to serve on the advisory board of his company and consider opening quarries in Central Texas. Mr. Ellis pointed out that his company will develop considerable property and several new cement plants are to be built. An ample supply of raw materials is assured by the purchase of extensive acreage in California.

Work to Start Soon on Huge Contract for Costa Rican Roads

A complete crushing plant will soon start producing crushed limestone to be used in the construction of roads and bridges in and around San Jose, Costa Rica. Machinery for this plant was built by the Smith Engineering Works for the Simmons Construction Corporation of Charlotte, North Carolina, to which the Costa Rican government has awarded a contract calling for the expenditure of four million dollars. The plant, which is entirely equipped with Telsmith machinery and requires about 150 h.p. to operate, will commence operations the latter part of May. The three solid carloads of machinery have already been shipped by the Smith Engineering Works to San Jose, Costa Rica via New York City, and Port Limon.

NEWS OF EQUIPMENT MANUFACTURERS



A Three-Speed Gasoline Locomotive

This Plant Locomotive Is Equipped With Three Speeds Either Direction

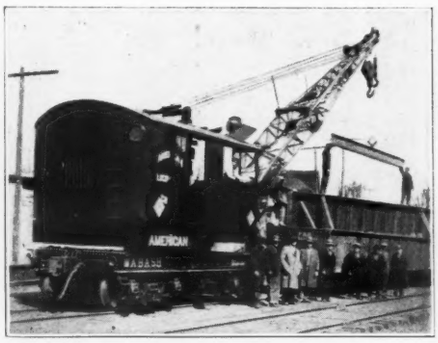
The use of light locomotives about industrial plants extends well into non-metallic industries. The Brookville Locomotive Company has recognized this demand and has installed numerous units such as shown in the accompanying illustration. This locomotive was formerly equipped with Model T Ford motors, but is now being provided with the new Model AA Ford truck unit, having a rated S.A.E. horsepower of 24.03. The drawbar-pull of this TCA Model locomotive is 15,000 pounds. There are the three speeds both forward and reverse. The machine may be had in any desired track gauge.

Novo Engine Company Appoints New Distributors

Novo Engine Company announces that the following have become distributors of Novo hoists, draglines, engines, pumps, and lighting equipments:

Jersey Contractors Equipment Co., Plainfield, N. J.; Fitzgerald and Hudson, New York City; Fred Lemcke, Jackson, Mich.; Wylie Brothers, Inc., Tulsa, Okla.; R. L. McDonald, Inc., Springfield, Mo.; Anderson Tractor and Equipment Co., Biltmore, N. C.; Tennessee Tractor Co., Nashville, Tenn.; Mine & Smelter Equipment Co., Phoenix, Ariz.; Lund and Co., Salt Lake City, Utah; R. T. McClelland, Inc., Oakland, California, Novo distributors for several years, now known as Krantz-McClelland, Inc., San Francisco, Calif.

The Pennsylvania Pump and Compressor Company announces the appointment of Carpenter and Byrne, Pittsburgh, as sales representatives in that district.



American Three-Speed Gasoline Crane

American Gasoline Crane Features Automotive Shift

The American Hoist and Derrick Company has issued a new Three-Speed Gasoline Locomotive Crane book describing how the advantages of both the steam-operated and the gasoline-operated locomotive cranes are combined in its gasoline crane with automotive gear shift. The machine which has the cleanliness of gasoline and the flexibility of steam, is not a steam crane revamped, but was designed from the very start for gasoline operation. Flexibility equal to that of a steam crane is obtained through the use of an automotive shift which works just like the transmission on your car; low gear for a powerful start, intermediate for average crane work and traveling, and high gear for rapid traveling.

Industrial Brownhoist Expands

Industrial Brownhoist Corporation of Cleveland has purchased The McMyler Interstate Company of Bedford, Ohio. The McMyler plant, machinery and materials, are not included in the purchase, but manufacturing operations and the business of the McMyler Company, together with all drawings and records, are to be moved to the Cleveland plant of the corporation. Through this McMyler purchase, Industrial Brownhoist acquires products supplementary to its own, which lines have been widely used.

Springtime Offices Removals

The general offices of Thomas L. Gatke have been moved from the Railway Exchange Building to the Builders Building, Chicago.

The Allen Cone Company and E. S. Tompkins, announce the removal of its offices in New York City to 30 Church Street.

New Cleveland Crane

Bucket Cranes Give Economical Service in Cement Plants

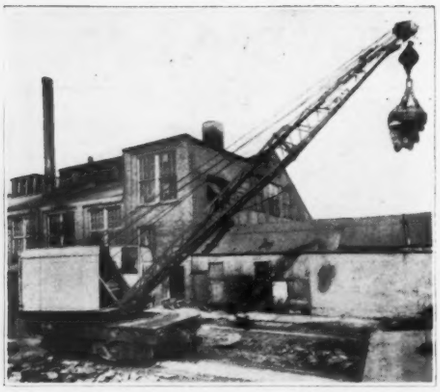
The illustration herewith shows a ten-ton traveling crane, manufactured by Cleveland Crane and Engineering Company, in service in the plant of the Glens Falls Portland Cement Company, at Glens Falls, New York. Its span is 65 feet. It is powered by two 100-horsepower motors, and has handled as much as 52,000 tons of cement material in one month at a cost of less than two cents per ton.

New Cincinnati 1200 Series Gasoline Locomotives

The locomotive division of the Cincinnati Car Corporation, Cincinnati, Ohio, announces its new 1200 Series gasoline-powered, gear-driven, industrial locomotives that embody numerous improvements in design and construction to bring about both greater simplicity and durability, as well as better performance. These are strongly reflected in the ease of operation and servicing, and in faster handling and continuous service. Four good starting and traveling speeds, both forward and backward. The engines are provided with oil purifier, gasoline strainer, and temperature gauge. The different models in this series are built in a variety of sizes and track gauges, and adapted for handling either industrial cars or railroad cars, and are recommended for any service where track haulage may be employed.

Booklet Explains Technique Of Acetylene Welding

The Oxweld Acetylene Company, manufacturers of apparatus for welding and cutting metals, has published a booklet entitled High Test Welding Rod which explains an improved rod for making stronger steel welds. The booklet is divided into two divisions, the first giving reasons for the specifications concerning this rod, and the second how to use it to the best advantage. This second division covers briefly the principles and technique of the process.



New Lorain Locomotive Crane

New Locomotive Cranes Are Placed on Market

The Thew Shovel Company presents the two new weights in locomotive cranes, both operated by gasoline engines ordinarily but which can be furnished with either electric or diesel power plants. The sizes are 15-ton and 20-ton. These machines have two speeds for travel in either direction, and can hoist, swing, and travel simultaneously under the control of one man. The double-truck car-body is 24 ft. 2½ in. long.

This Handy Device Quickly Rerails Cars

Johnson car rerailers are used in quarries and at plants where T-rails are used. The device, when not carried on the engine, is stored at some switching point where it will be accessible when cars get off the track. This time- and labor-saving device has been generally used for over twenty-five years. It is manufactured by the Johnson Wrecking Frog Company.

American Three-Speed Gasoline Crane Has Wide Flexibility

The American Hoist and Derrick Company manufactures a locomotive crane that is powered with a gasoline engine but that has every range and flexibility possessed by a steam crane. This American three-speed crane will perform any sort of duty that is expected of a crane around quarries or non-metallic plants. Power is applied to a point that corresponds to the crankshaft of a steam crane. The engine fits down into and is bolted to the bed. The body is mounted on two 4-wheel swiveling trucks and all body parts comply with American Railway Association standards. It is built in capacities of 12 tons to 30 tons.

A Small Shovel Mounted Upon a Tractor

The Trackson Company produces a compact machine that proves useful in quarries. The cut herewith shows one of these units that is used at the Nast Lime & Stone Company's new plant at Marblehead, Wisconsin. It will be seen that it comprises a caterpillar tractor and a shovel. This is known as a crawler-shovel. The tractor part of this machine is of McCormick - Deering make.

Manganese Steel Forge Company Opens Cleveland Office

A sales office has been established in Cleveland by the Manganese Steel Forge Company, manufacturers of ROL-MAN rolled and forged manganese steel products, Philadelphia, Pennsylvania. The new office is at 623 Union Trust Building and is in charge of P. M. Hobbs, who has been connected with the sales departments of the company's main office and of the Chicago office, and who will service users and prospective users of ROL-MAN products in the Cleveland territory.

Steel Mules Are Described In New Pamphlet

The Bates Manufacturing Company which is a part of the road machinery division of Foote Bros. Gear and Machine Company has issued a large pamphlet descriptive of its tractor which goes by the trade name of Steel Mule. This is of the crawler type and carries the slogan "Every inch a tractor." It is built broad and low, the width adding to tractive ability, especially on side-hill work. Its power is developed by a Waukesha 4-cylinder motor. The transmission gearing provides three speeds forward and one reverse. It is built in sizes ranging in strength from 28 hp. to over 65 hp.

New Light Coal-Car Unloader by Barber-Greene

A new light car unloader for unloading hopper-bottomed cars of coal and coke is announced by the Barber-Greene Company. In designing the feeder attachment, (a motorless car unloader, taking its power from the B-G flight conveyor) which was announced a few months ago, the Barber-Greene engineers made a decided departure from anything ever developed along this line. In fact, they produced a machine so superior even to their own anticipations, that they immediately started to work on the same unit with engine attached.

Since large production has already been obtained on the feeder attachment, and since the B-G engineers have worked out a very simple way of mounting the power unit on the feeder, thus making it the new light car unloader which is pictured herewith, the cost of manufacture is very low.

This small light car unloader has a capacity of a ton per minute. It is only 3⅝ inches thick over the rails, allowing ample clearance for the largest hopper doors, and weighs only 1,700 pounds. The machine is powered with either gas or electricity as desired and is so balanced that one man can raise one end easily for moving. This machine, although small, is composed of the same quality of materials which make up the well-known large B-G car unloader (capacity two tons per minute). For instance, the bottom plates over which the coal and drag flights travel are of high carbon steel—renewable.

Snatch Blocks Are Made Of High Steels

The R. H. Beaumont Company makes a snatch block for use in cable-drag service that is light in weight, with a swivel eye and snatch attachment. It has a manganese-steel side-frame and a chrome-nickel high manganese-steel sheave. It is designed with a fixed bronze bushing and a steel bushing inside the sheave. It is lubricated by a Dot fitting, to a reservoir in the hub.